GRINDING and FINISHING

MARCH 1959

IN THIS ISSUE: **Air Tool Control Program Promotes Safety**
"In Place" Roll Grinding
"Built-In Guard" Cup Wheel

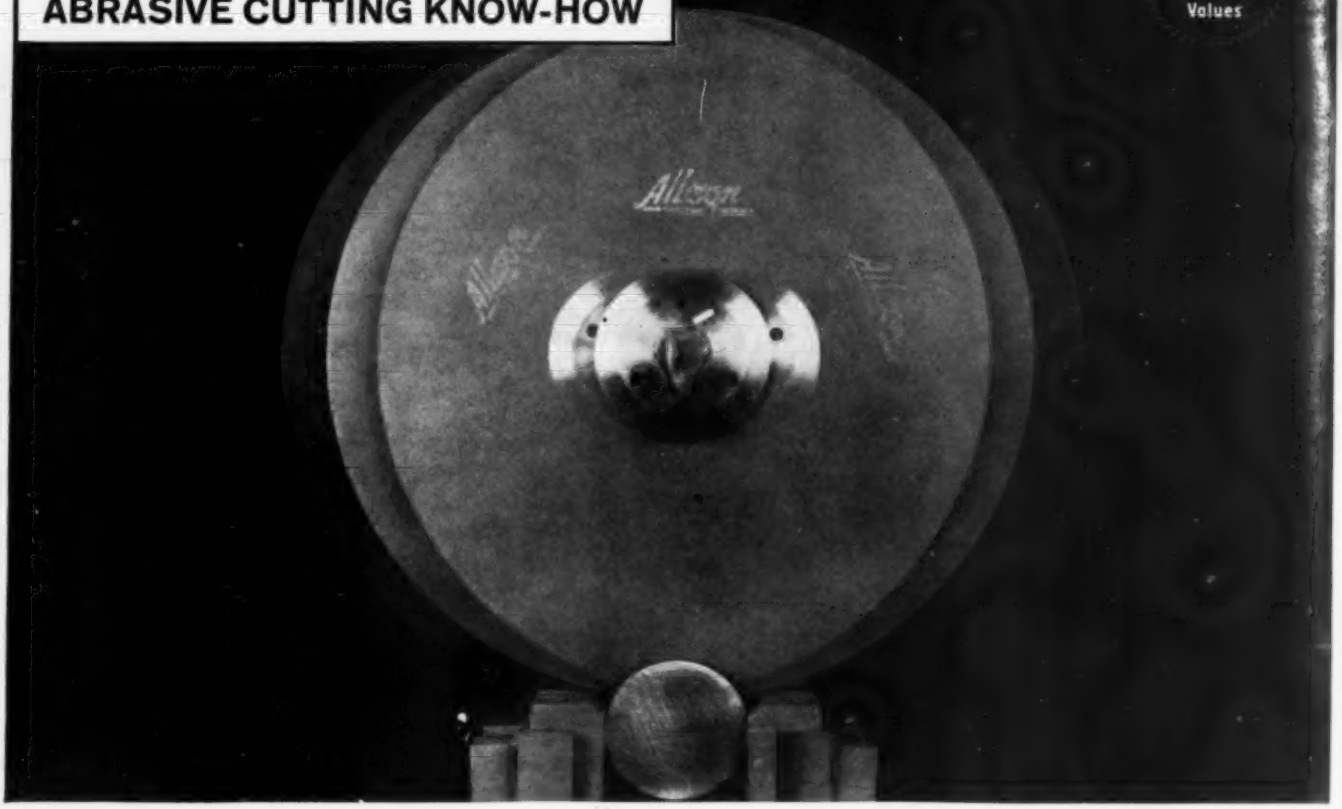
DETROIT 2 MICH 731
LIBRARY
MAR 20 1959
DETROIT

A HITCHCOCK PUBLICATION

Allison-Campbell

ABRASIVE CUTTING KNOW-HOW

ACCO
for Better
Values



Oscillation Improves Abrasive Cutting 4 Ways

On an oscillating-type abrasive cut-off machine, the cutting wheel is rocked back and forth *across* the cut while the wheel is fed downward. This horizontal movement produces some remarkable results.

1 **Greater cutting capacity** is one big advantage of oscillation. Because oscillation reduces the arc of contact between the wheel and the work, it is possible to cut solid steel bars up to 12″ square. Without oscillation, 2″ to 3″ would be the practicable limit.

2 **Faster cutting** is another benefit of oscillation. Because the reduced arc of contact offers less resistance to the cutting wheel on large sections, the same wheel cuts faster, straighter, and with less feed pressure. Cutting rates of 4 to 8 seconds per square inch are maintained on even the largest cross-sections.

3 **Better quality cuts** are obtained with oscillation. Less heat is generated because of the small arc of contact, and the rocking action permits coolant to enter the cut more easily and prevent any heat build-up.

Burn-free cuts are produced with negligible burr, and there is little or no need for further finishing.

4 **Longer wheel life** is an important economy factor. The lower cutting temperature resulting from oscillation adds extra cuts to the life of every wheel.

The better flow of coolant within the cut washes away metal chips and loose abrasive, helping wheel efficiency.

HOW ALLISON-CAMPBELL CAN HELP

A complete selection of machines and wheels for *any* cut-off application is offered by ALLISON-CAMPBELL. Four types of CAMPBELL machines—chop stroke, oscillating, horizontal, and rotary—in capacities from the smallest stock to 14″ rounds . . . billets up to 12″ square . . . plate up to 6″ thick and 20 ft. long. ALLISON wheels—more than 150 different specifications—rubber or resinoid bond—3″ to 34″ diameters—.006″ to 3/16″ thick.

Expert recommendations from your ALLISON-CAMPBELL Field Engineer can solve your cut-off problems for you. He'll be glad to show you how to get the faster, cleaner cuts you can expect from modern abrasive cutting techniques. Ask him.

WRITE FOR NEW BULLETIN

• Individual analysis of your cutting problems can be made in the new ALLISON-CAMPBELL Demonstration Laboratory. Write for a copy of DH-20, a new bulletin which describes how you can use these facilities. Complete details on ALLISON wheels and CAMPBELL machines are also available.

ALLISON-CAMPBELL DIVISION
AMERICAN CHAIN & CABLE

ACCO

926 Connecticut Avenue, Bridgeport 2, Conn.

Use postpaid card. Circle No. 283

WHEREVER ABRASIVE OPERATIONS ARE PERFORMED

GRINDING and FINISHING

CONTENTS FOR MARCH • 1959

Feature Articles

28 Allis-Chalmers Portable Tool Control Program
Portable tools are perhaps the most widely misused of all grinders. This report of an airtool control program which has been in operation for nearly four years contains ideas of interest to every user of portable grinders. By J. G. Sdano.

36 "In Place" Roll Grinding
Roll grinding and its accompanying difficulties of machine down time and spare roll inventory are major factors in the maintenance budget of many companies. This is an account of a roll grinder attachment which could reduce such difficulties. By Frank Buonomo.

40 The Case for "Built-In Guard" Cup Wheels
A series of tests which compares cup wheels containing a one-piece prong bushing and safety back molded in, against conventional cup wheels reinforced with either a prong bushing or a steel ring. By Howard R. Kerber.

42 Tool Geometry Grinding Solved
A new tool grinding machine with a unique type of tool holding assembly grinds single point tools with accuracy and assured repeatability. Special to Grinding and Finishing

45 Surfacing Zirconium Alloy Sheets with Abrasive Belts
An uncontaminated flat surface which could permit sheets of zirconium to be bonded satisfactorily by the gas-pressure method was the problem. By Dr. Hugh N. Dyer and R. A. Leggett

47 Here's How Wet Blasting Cleans Forging Dies
Life of the dies is lengthened and cleaning time substantially cut by wet blasting. Little or no hand touch-up work required. By L. D. Stevens

Departments

4 Letters
9 Editor's Page
11 Grinding Safely
13 You Asked . . .
22 Metalworking in General
49 Ideas from the Shop
53 Literature
59 Equipment and Materials
71 News of the Industry
84 A Final Thought

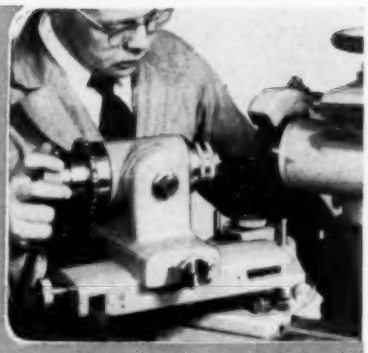
MARCH COVER: The safety problems of portable grinding are many and difficult. An Allis-Chalmers solution to one of these problems is the development of the "bomb shelter" depicted on the cover. When a wheel is mounted on the grinder in the tool crib, the attendant brings the wheel safely up to operating speed inside the shelter.

NEXT MONTH: Buffing is an art which like other grinding and finishing operations presents many varied problems. Some of these problems are cases of finding the right combination of wheels and buffing compounds, while others result from previous treatment of the material. Some of the solutions can be found in methods of buffing developed at Ford's Monroe, Michigan plant.

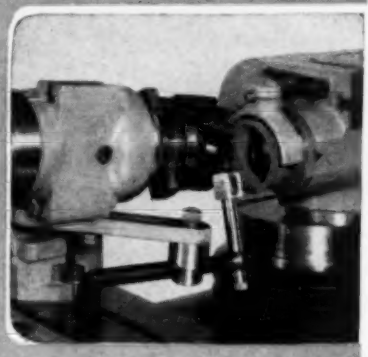
Subscription rates: $6.00 per year in U.S.A. $7.50 per year elsewhere. Copyright 1959, by Hitchcock Publishing Co., Wheaton, Ill. Phone MOntrose 5-1000. Cable address: HITCHPUB
Accepted as controlled circulation publication at Pontiac, Illinois.

Cincinnati Cutter

accurately grind



Ball nose cutter, ground with the aid of a Radius Grinding Attachment mounted on a CINCINNATI No. 1.



Shell end mill cutters are ground in position on their arbors. This cutter is being ground on a No. 2 CINCINNATI.

Taper reamers, most demanding of all, are given the highest quality grind on a CINCINNATI. The setup is on a No. 2.

Heavyweight 18" diameter face mills can't hamper the smoothness and ease of traversing the table. The No. 2 handles these large cutters.

CINCINNATI Cutter and Tool Grinders give you the opportunity to attain two desirable objectives in your cutter maintenance program: 1) Cutters are quickly and accurately restored to top cutting trim. 2) Cutters of any size and type, ranging from small end mills no bigger than a pencil to heavy 18" diameter face mills, can easily be ground on these machines. ¶Check these advantages of CINCINNATIS against any other equipment within their range:

Anti-friction ball bearing table slide, with hardened and ground ways

Eccentric swivel mounting of wheelhead for 360° positioning and extra range

The convenience of four-position operating control

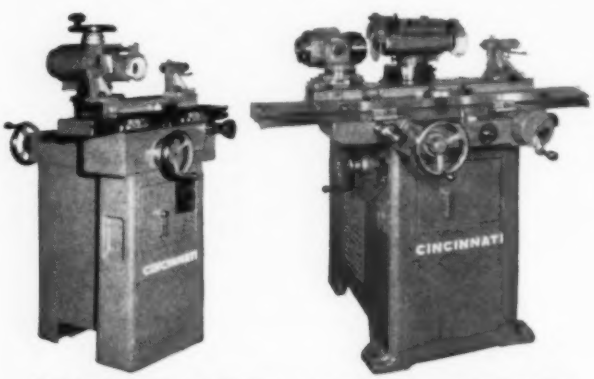
The quick accuracy of "Tange-Bar" taper setting device

Dozens of attachments and accessories to speed the grinding of every conceivable type of cutter

There are many other reasons why you should choose Cincinnati for all your cutter grinding requirements. Want more information on Cincinnati's versatile Nos. 1 and 2 Cutter and Tool Grinders? Write for catalogs indicated below.

Brief specifications

Size	No. 1	No. 2
Swing over table	8"	10"
Length of work, between tailstock centers	15"	27"
Range: longitudinal	10"	16"
cross	4½"	8"



CINCINNATI CUTTER AND TOOL GRINDERS

No. 1 *(left)* Catalog No. M-1852-2
No. 2 *(right)* Catalog No. M-1914-4

CINCINNATI® KNEE TYPE MILLING MACHINES • BED TYPE MILLING MACHINES DIE SI

and Tool Grinders

just about every cutter in the shop

Rear right-hand working position is the most convenient for grinding a shell end mill on this **CINCINNATI No. 1 Cutter and Tool Grinder.**

CINCINNATI

DIE SINKING MACHINES • CUTTER AND TOOL GRINDERS

MILLING MACHINE DIVISION
The Cincinnati Milling Machine Co.
Cincinnati 9, Ohio

Use postpaid card. Circle No. 201

PRODUCTION PROTECTION

. . . use the only DIAMOND WHEELS with the LOK® SURE PRESS

PERFORMANCE BOND

THIS WHEEL IS A PRECISE DUPLICATION OF YOUR SPECIFICATION. WARRANTEED WHEN PROPERLY OPERATED. TO GIVE YOU THE LOWEST COST PER CUT OF ANY WHEEL.

PRESIDENT

THE PROPER BOND IS NECESSARY

To reduce carbide cutting costs to a minimum, every Diamond particle must constantly have sharp angular faces exposed to the work piece. Pressure-lok bond controls each abrasive grain just as long as facets of that Diamond present sharp cutting edges. Pressure-lok uses uniformly graded Diamond (no fines) of *warranteed* density in the world's finest bond.

be SURE . . . get PRESSURELOK®

HERE'S WHY PRESSURELOK WORKS BEST

Pressurelok is the best of Diamond Wheels because it scientifically combines warranteed amounts of graded Diamonds distributed in constant density throughout a perfect bond which wears uniformly at the ideal rate of Diamond wear.

REMEMBER:
We've Never Failed To Deliver.

US UNITED STATES DIAMOND WHEEL CO.

835 ILLINOIS AVENUE AURORA, ILLINOIS

Use postpaid card. Circle No. 202

Editor's Mail

Predicting Abrasive Production

I was glad to see an article of the "Predicting Abrasive Production from Steel, Auto Forecasts" type in GRINDING and FINISHING. I would appreciate it very much if you could send me four or five tearsheets of this story from the December issue. I should like to use it in my talks before the National Metal Trades Association's members on production control and cost reduction.

Otto Forchheimer has done a fine job of indicating the correlation which exists between the available statistics in one area of our economic activity and the likely developments in another area. It is my opinion that such correlations could be effectively used by business managers to improve their profits—particularly in the smaller business venture.

Unfortunately, it appears that such correlations and the necessary statistical analysis strike the operating business manager as text-bookish or "up-in-the-clouds" type of thing. Perhaps, GRINDING and FINISHING can bring this concept down to ground level—at least for the abrasive industry—by some follow-up on it in future issues of the magazine.

E. A. Cyrol
E. A. Cyrol & Co.
Chicago, Ill.

Coated Abrasives

We read in GRINDING and FINISHING of October 1958, to which we are a subscriber, the book review mentioning "Coated Abrasives—Modern Tool of Industry."

We are very interested in this work and beg you to specify us the way to obtain the book. Thanking you beforehand for your reply, we are, gentlemen, with kind regards.

Dr. R. Zane
Milano, Italy

Crankshaft Grinding at Ford's

If at all possible, we would like 25 copies of the article, "Crankshaft Grinding at Ford's Lima Engine Plant," which appeared in the November, 1958 issue of GRINDING and FINISHING.

William Koinis
Oatis Machinery Co.
Toledo, Ohio

Handling Grinding Wheels

Having read your article on Handling Grinding Wheels in the December issue of GRINDING and FINISHING, I was wondering if you might have any information on the proper storage of these wheels. I would appreciate anything you could send along in regards to the above.

J. M. Boyd
Methods Engineering
Automatic Electric Co.
Northlake, Ill.

Back Issues of G & F

We want to thank you for the promptness with which we received the requested back issues of GRINDING and FINISHING magazine. Our prime purpose in having these issues 1955-1958 inclusive bound was to assure ourselves that they would be on hand for ready reference at all times. People coming in and out of the Engineering Department have the easy habit of picking up a back issue and forgetting to return it.

E. N. Voyles
Peninsular Grinding Wheel Sales Corp.
Detroit, Mich.

"What Is Happening to the Skilled Craftsman?"

Your article, "What Is Happening to the Skilled Craftsman?", appearing in the December issue of GRINDING and FINISHING is of particular interest to me.

I am Assistant Professor of Industrial Engineering for The Pennsylvania State University doing Management Training work in the industries of Pennsylvania.

In conjunction with this work I would like to make use of your article. May I have your permission to have it duplicated in mimeograph form for distribution and discussion to my many foreman groups?

It is understood that proper credits will be included both to GRINDING and FINISHING and to you as an individual.

C. N. Shellito
Behrend Campus
The Penna State University
Erie, Pa.

Permission granted.

HALT

heat damage to carbide tipped tools

SIMONDS PLATE MOUNTED WHEELS

(OPEN STRUCTURE)

with **NEW V9 BOND**

Simonds GC Electrolon (green silicon carbide) grinding wheels are made with very open structure by a new method to produce the desired voids or pore spaces . . . for cooler, faster grinding. The new V9 vitrified bond is a chemically designed glass bond more controllable for more uniform grinding action. Furnished plate-mounted for all grinders. Typical specifications for carbide tool grinding: GC60-H12-V9 for roughing; GC120-H12-V9 for finishing.

CALL YOUR SIMONDS DISTRIBUTOR

Proven products
Dependable know-how
Quick supply

SIMONDS ABRASIVE COMPANY

Tacony & Fraley Sts., • Philadelphia 37, Pa.

Division of Simonds Saw and Steel Co.

BRANCHES: CHICAGO•DETROIT•LOS ANGELES•PHILADELPHIA•PORTLAND, ORE.•SAN FRANCISCO•SHREVEPORT

Use postpaid card. Circle No. 203

How Warren Pouyer cut grindingos

Six years as a tool and die maker gave Bay State's Warren Pouyer a basic knowledge of precise metal working problems that many an "expert" would envy. For the last nine years, he has specialized in abrasives and has gained a tremendously wide knowledge of grinding methods and materials.

Moog operator gets heavy, rapid stock removal using Bay State wheel to grind eye of automobile spring leaf.

...osts 1/3 at Moog Industries

Too many wheels were being used up too fast. That was the basic problem in the spring eye grinding operation at Moog Industries, St. Louis, Mo. A leading manufacturer of truck, trailer and automobile springs, Moog makes a complete line of front-end, chassis parts . . . and in this highly competitive business, keeping grinding costs down is vitally important.

So they called in Warren Pouyer of Bay State distributor Mill Supply & Machinery Company and he spotted the trouble right off the bat: disc grinding wheels of a specification that looked as if it *ought* to be right but wasn't. Pouyer specified the proper Bay State wheel using a semi-friable type of aluminum oxide with a unique combination of grit sizes. Production increased 33% per wheel without loss of operation speed.

Since then, the Bay State wheel has been competitively tested over and over again and it has come out on top every time . . . a tribute to Warren Pouyer's ability to specify exactly the right wheel, in this case the first time, and to Bay State's ability to reproduce a given spec *exactly* and *consistently*.

Warren Pouyer doesn't solve all his grinding problems as quickly as this. Like all Bay State representatives, he's trained to study every problem *thoroughly*. And whether a particular problem has a simple solution or a tricky one, you can be sure *your* Bay State man will stick to it until he works out a practical, economical answer. *Better grinding at lower cost—that is his business.*

BAY STATE WHEELS of PROGRESS

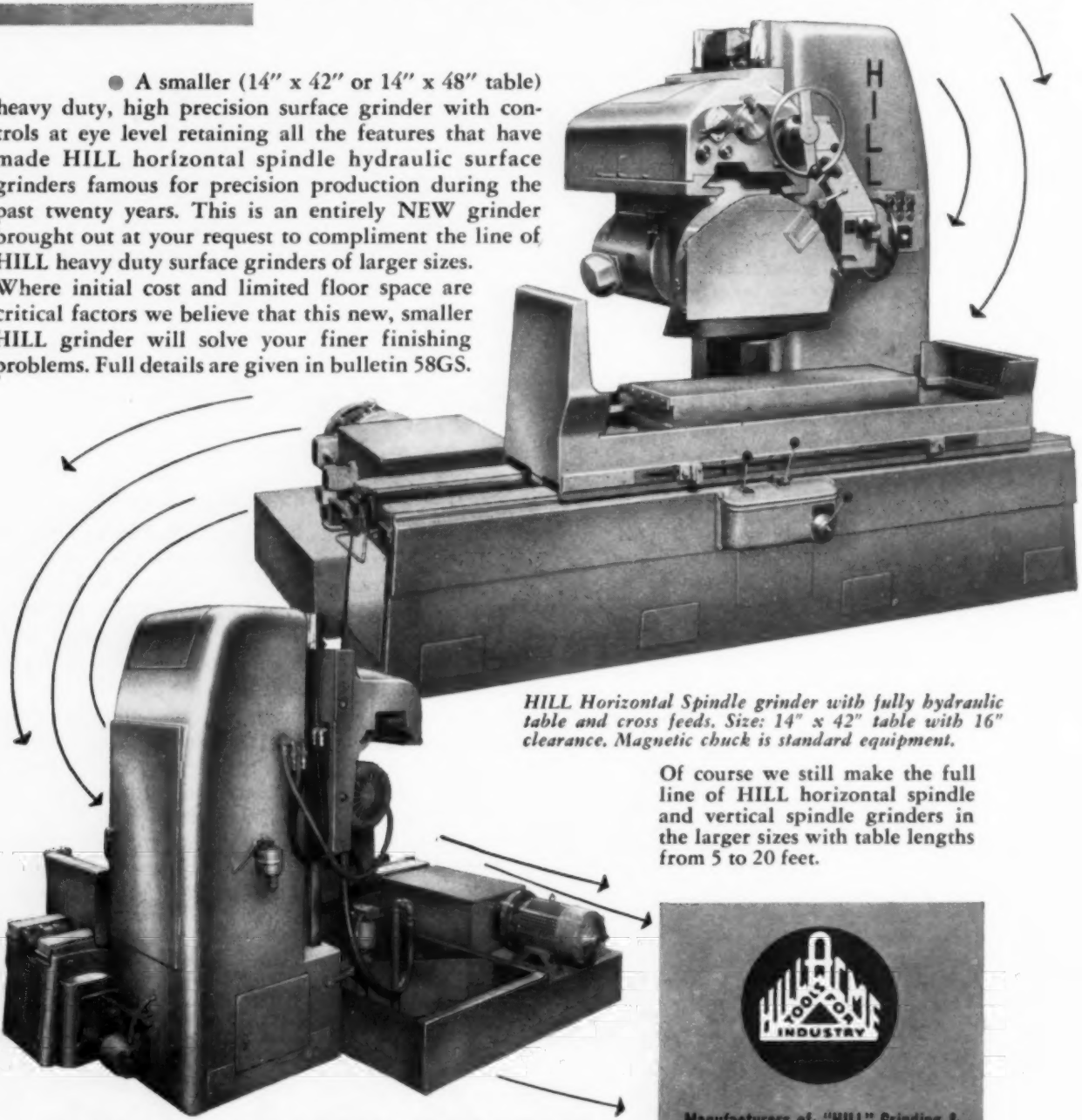
BAY STATE ABRASIVES

Bay State Abrasive Products Co., Westboro, Massachusetts.
In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ontario.
Branch Offices: Bristol, Conn., Chicago, Cleveland, Detroit, Pittsburgh. *Distributors:* All principal cities.

Use postpaid card. Circle No 204

HERE IS THE GRINDER YOU ASKED FOR!

● A smaller (14" x 42" or 14" x 48" table) heavy duty, high precision surface grinder with controls at eye level retaining all the features that have made HILL horizontal spindle hydraulic surface grinders famous for precision production during the past twenty years. This is an entirely NEW grinder brought out at your request to compliment the line of HILL heavy duty surface grinders of larger sizes. Where initial cost and limited floor space are critical factors we believe that this new, smaller HILL grinder will solve your finer finishing problems. Full details are given in bulletin 58GS.



HILL Horizontal Spindle grinder with fully hydraulic table and cross feeds. Size: 14" x 42" table with 16" clearance. Magnetic chuck is standard equipment.

Of course we still make the full line of HILL horizontal spindle and vertical spindle grinders in the larger sizes with table lengths from 5 to 20 feet.

THE HILL ACME COMPANY

1207 W. 65th STREET
CLEVELAND 2, OHIO

HILL-ACME TOOLS FOR INDUSTRY

Manufacturers of: "HILL" Grinding & Polishing Machines — Hydraulic Surface Grinders — "ACME" Forging — Threading — Tapping Machines — "CANTON" Alligator Shears — Billet Shears — "CLEVELAND" Knives — Shear Blades

Use postpaid card. Circle No. 205

Editor's Page

MARCH 1959

EDITORIAL STAFF

William F. Schleicher
vice president and editorial director

Maurice M. Patterson
managing editor

Richard L. McKee
associate editor

M. Moffet
assistant editor

Vic Erickson
editorial art director

BUSINESS STAFF

Robert C. Van Kampen
president

Vincent C. Hogren
executive vice president

J. E. Hitchcock
vice president

Oliver S. Pepper
business manager

John S. Todd
production manager

F. S. Larson
advertising production manager

Robert L. Spreckels
circulation manager

Gene West
fulfillment manager

Ray Sietsema
director of research

Bruce B. Howat
marketing director

L. M. Schroeder
advertising art director

Was it an Act of God?

Stop right now and think of every recent accident you have heard of or been involved with. If they did not occur as a true accident they could have been prevented and something can be done to prevent a reoccurrence of the same accident!

What is a true accident? The only true accidents are acts of God. That is accidents as the result of lightning, wind, floods, etc. If a finger is badly bent while getting too close to a moving grinding wheel, this is not a true accident and could have been prevented.

Many of the accidents you are thinking of may be considered the results of carelessness. "Someone left that cotton-picking tool in the middle of the aisle"—or some other more expressive thought may come to mind. If someone has fallen over the tool it was careless to have left the tool there, but it was also careless not to have seen the tool. The point is everyone is responsible for the safety of others as well as for himself. Safety is seldom easy or pleasant but there is a way.

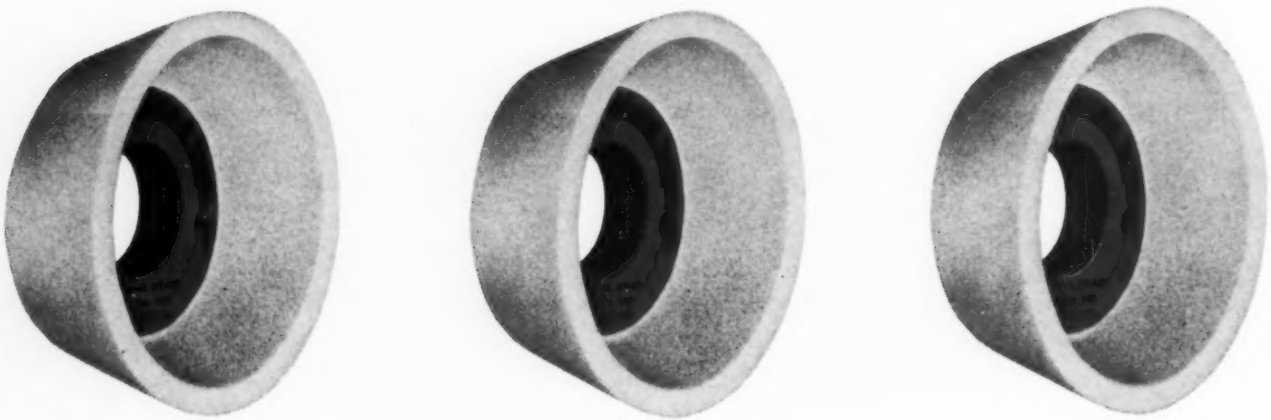
The lead article of this issue describes a safety program for an area within the plant which is very hard to control. To install and continue this program has cost the company money. It has not been easy or pleasant but it has been rewarding. This control program fulfills our premise. Figuratively speaking, they have alerted the man who did not see the tool in the aisle as well as the man who left the tool there.

This article will give you some ideas on what you can do about your own problems and in that way make your solution that much easier. It will still be difficult but the rewards will be worth it. You can grow finger nails for what they're worth but wooden replacements for limbs will never fill the bill. This is your job and mine. Its an obligation.

M. M. Patterson

Managing Editor

POSITIVE DUPLICATION – EVERY TIME!



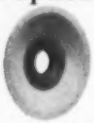
Each of these gyroscopes positively duplicates the built-in balancing action of every other gyroscope.

And *balance built-in* is an important advantage you get with the toolroom cup wheels shown above, and with *all* CINCINNATI (PD)° GRINDING WHEELS. They are manufactured by a remarkable process that gives Positive Duplication, time after time after time.

With every step of manufacturing rigidly controlled, this unique (PD) process produces wheels of unsurpassed uniformity. One important result: balanced action for a safer job . . . a better job.

When you reorder a CINCINNATI (PD) WHEEL, it will act and grind exactly like the original, helping you maintain production, saving time and money. Whatever shape, grade and size

you specify . . . centertype, centerless, internal, surface, toolroom or snagging wheel . . . you get Positive Duplication — every time!



Our factory representatives are trained specialists, experienced in grinding job set-ups and operations. For their help on those extra-tough grinding problems, call your CINCINNATI (PD) GRINDING WHEEL distributor, or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

(PD) POSITIVE DUPLICATION

CINCINNATI°

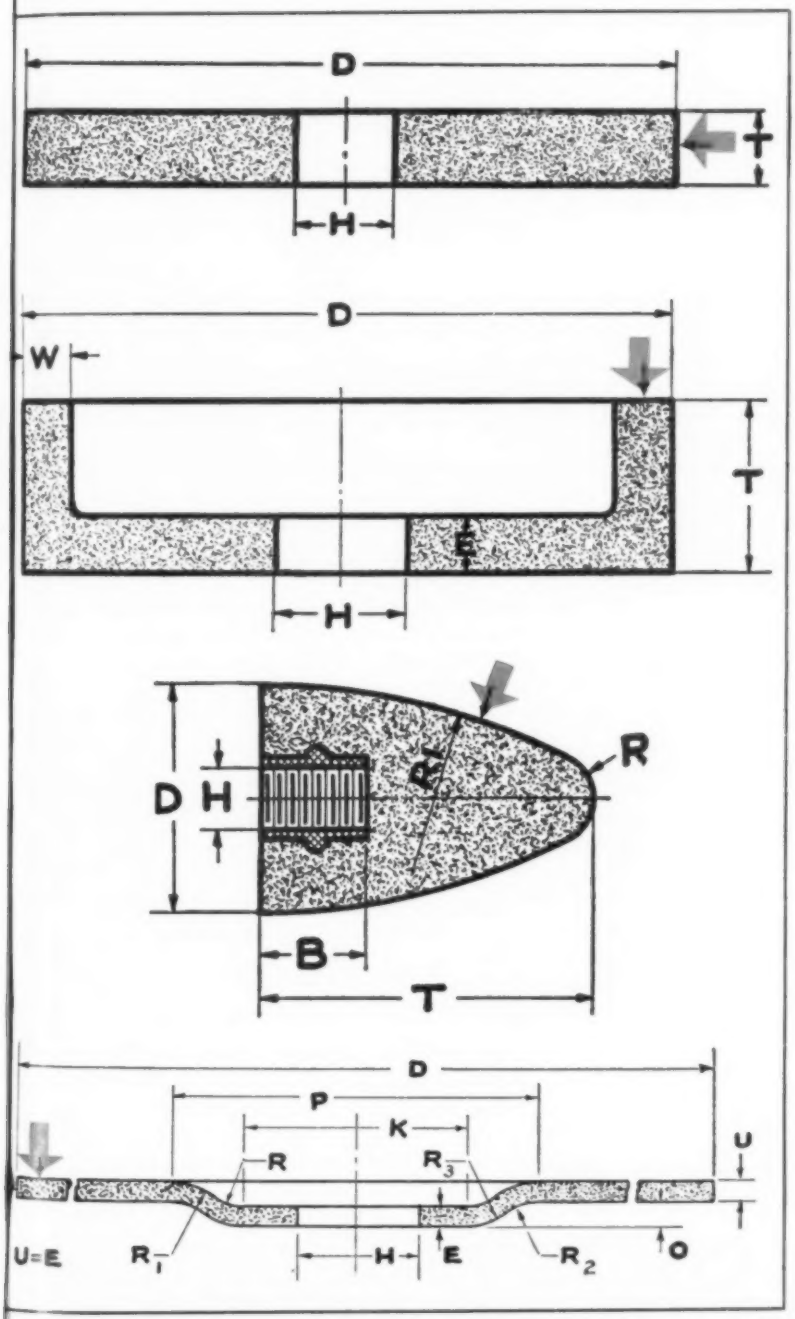
GRINDING WHEELS

A PRODUCTION PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

Use postpaid card. Circle No. 206

Grinding Safely

RICHARD L. McKEE • Associate Editor



Reading from top to bottom, the standard designations of the grinding wheels shown above are: Type 1—straight wheel; Type 6—straight cup wheel; Type 16—cone; and Type 27—depressed center wheel.

R-r-r-right Face!

● Few grinding wheels are two-faced. Most of them have only one that is the right face for safe grinding. Which one it is, whether periphery or wall, depends on the shape type of the wheel. For a generalization, the pressure of the work piece is most often against a thick part of the wheel. In the illustrations, arrows indicate grinding surfaces.

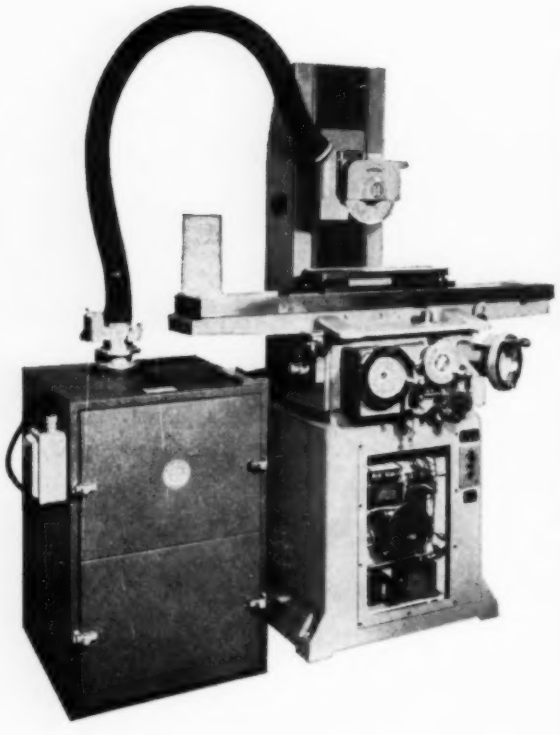
Of the twenty standard shape types listed in Standard Shapes and Sizes of Grinding Wheels (Simplified Practice Recommendation R45-57), eleven are designated exclusively for peripheral grinding. All of these are variants of the Type 1 (straight) wheel, with differing combinations of recessed and/or relieved sides.

Three of the others, Type 6 (straight cup) wheel, and Types 2 and 11, cylinder and flaring-cup wheels, respectively, are designated for wall grinding.

Because cones and plugs are normally mounted on a spindle with a blind hole threaded bushing, grinding can be done on all surfaces except the flat (dimension "D" on the mounting side. There are four standard shapes of cones and plugs.

The most widely used "two-faced" wheel is the Type 27 (depressed center) wheel, which is usually reinforced and thus able to withstand the pressure on the side against a relatively thin section. The other is a Type 12 (dish) wheel not illustrated.

Chances are, therefore, that the right face for grinding is the periphery or O.D. And that's why the Grinding Wheel Institute says, "DON'T grind on the SIDE OF THE WHEEL unless the wheel is specifically designed for that purpose." • • •



MODEL 618 P
with dust collector

REID-O-MATIC 824 . . .
fully automatic

Industry's number one choice . . . for toolroom and production economy!

The vast number of REID *precision* surface grinders, in all kinds of industry, is the best proof of their outstanding quality.

In the 618 class these different models are available; a 618 P with power operated table and cross feed — a 618 PT with power table and hand operated cross feed — and a completely manual grinder, the 618 H. Automatic lubrication and a Cross Slide Lock are included on REID grinders as standard equipment.

The REID-O-MATIC is a fully automatic, all electric, surface grinder with a capacity 8″ wide, 24″ long and 21″ from the table to the center of the spindle.

For your production and toolroom grinding, REID surface grinders offer the maximum in convenience, quality and economy.

Accessories can be furnished for wet grinding, cool grinding, dust collecting and other needs.

Complete specifications will be sent on request.

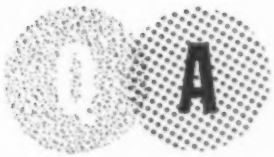
PRECISION SURFACE REID GRINDERS

Manufacturers of precision surface grinders for production and toolroom needs

REID PRECISION SURFACE GRINDERS

REID BROTHERS COMPANY, INC. / 133A ELLIOTT ST. / BEVERLY, MASSACHUSETTS

Use postpaid card. Circle No. 207



You Asked . . .

By ARTHUR RAKESTRAW

SIZE LIMITS FOR ABRASIVE GRAIN

● What are the allowable limits of over- and under-sized grain for a given grit size? Would this kind of grain have any effect on wheel performance?—J. S. Utica, N.Y.

Grain size numbers, as established by the Bureau of Standards, are the same throughout the abrasive industry. These standards are a matter of record with the U.S. Department of Commerce and are available on request.

The first part of your question, unless confined to a definite grit size, could involve volumes for charts and explanation.

In the reduction of abrasive ore to usable grit sizes, the resultant grain is very irregular in shape, even though the milling process is followed by very accurate screening in order to establish size limits. For instance, a grain might pass through a designated screen, yet possess a third dimension, length, that would exceed the screen aperture.

For example, a No. 20 grain will pass through a screen with 16 meshes per lineal inch and be retained on a screen having 24 meshes per inch. The average particle size of No. 16 is .0655"; No. 20 is .0528" and No. 24 is .0408". It is therefore obvious that the limits of No. 20 grain size could vary from .0655" to .0408". As the grain size number becomes smaller, the limits are very much reduced.

In grinding operations where the resultant finish depends largely on the method of wheel face truing, the variation in grit size would have no appreciable effect. In fact, the majority of abrasive wheels are manufactured with a combination of two or more grit sizes in varying amounts.

However, on grinding operations such as ultra high finished steel rolls or the surfacing of plastics, the presence of coarse grits in a comparatively fine grit wheel can jeopardize the final finish requirements.

The control of grit size is most important in organic bonded wheels where grinding is performed without frequent wheel face truing.

CAUSES OF WHEEL BREAKAGE

● Is there any way of telling, from the way a wheel breaks, what might have caused it to break?—K. J. Rockford, Ill.

As a rule, the general appearance of the fractured sections of an abrasive wheel give very little conclusive evidence of the cause of breakage. Fractured pieces are usually marked by contact with the wheel guard, thereby destroying informative evidence. It is usually necessary to carry on a complete investigation of all the factors associated with a particular incident.

Inasmuch as all of the abrasive wheels have received a speed test (usually 50% above recommended operating speed) before shipment, we can assume that the product is structurally satisfactory, unless damaged in transit or subsequent storage. If abrasive wheels are tested (by ringing) before mounting and the operating speed is correct for the particular wheel, we can rightfully assume that breakage resulted from improper mounting or usage.

Improper mounting involves factors such as warped wheel flanges, excessively or unevenly tightened flange bolts or spindle nuts and similar conditions.

Improper usage involves a multitude of factors. Methods of operation, for instance, might impose undue stresses on the wheel.

In the case of bench stand grinding or snagging, breakage might result from sudden and excessive heating of the wheel face, side pressure or impact, or by wedging of the work piece between the rest and the wheel periphery.

In years of wheel breakage investigations, we usually found it necessary to ferret out the cause with little or no direct assistance from the customer, although in many cases it was quite obvious that the actual cause of the breakage was known to the operator.

CLEANING POLISHING COMPOUNDS FROM BRASS

● In polishing brass with various compounds we have experienced some difficulty in removing the grease in the compound deposited after the polishing operation. Several materials have been tried, but without too much success. Would you help us by suggesting some liquid which would remove this material so that a good lacquer job can follow—L. B. Orange, Mass.

You did not mention the type of polishing compound you have been using, which may have an important bearing on the solution. Stearic acid base compounds are very difficult to degrease, while abrasive buffing com-

3 STEPS TO THE *TOP* BUY...

ACTION DIAMOND WHEELS

HONES – MOUNTED POINTS

1 YOU TELL Action Diamond what you want your diamond wheel to do.
2 YOU USE the wheel Action Diamond designs and builds to do your particular job.
3 YOU GET precisely the right diamond wheel in shape, grit and bond to assure the accurate, low cost production that only a custom-built Action Diamond wheel can deliver.
JETALINE DIAMOND WHEEL
RoBot Resin DIAMOND WHEEL

Custom Built for the Job at No Extra Cost

Your custom built Action Diamond wheel has the same price tag as any diamond wheel of comparable specifications. The extra production per wheel delivered is all profit for you. Call Action in, by letter or 'phone. Show us your grinding problem. You are guaranteed an expert analysis of your diamond wheel requirements at no cost, no obligation.

At ACTION . . . The Right Wheel For Your Material

RoBot Resin DIAMOND WHEELS	• for wet or dry grinding.
Jetaline DIAMOND WHEELS	• for conventional wet grinding. • for electrolytic grinding.
Jetaline METAL BONDED ABRASIVE WHEELS	• for electrolytic grinding.

PHONE, WRITE, OR TELETYPE

ACTION DIAMOND TOOL CO.

The Pioneer of The Modern Diamond Wheel

4545 WEST GRAND AVENUE, CHICAGO 39, ILLINOIS

Telephone: CApitol 7-5321 Teletype: CG 3393

Use postpaid card. Circle No. 208

You Asked . . .

pounds made up with mineral bases are most readily degreased.

It seems to be the consensus of a number of informed men in this field who have been consulted, that you should experiment with a cleaning solution of trichlorethylene. This solution, used as recommended by the manufacturer, has produced excellent results in removing greasy compound film from polished parts.

If you are using a polishing compound with a stearic acid base, you might want to change to a mineral base compound which will permit degreasing with less difficulty.

Should you still experience trouble with degreasing, it would be well to consult one or more of the several manufacturers of cleaning materials.

GRAIN IMBEDDED IN WORK PIECE?

● **In surface grinding, is there ever any danger of abrasive grain becoming imbedded in the work piece?—M. O. Pittsburgh.**

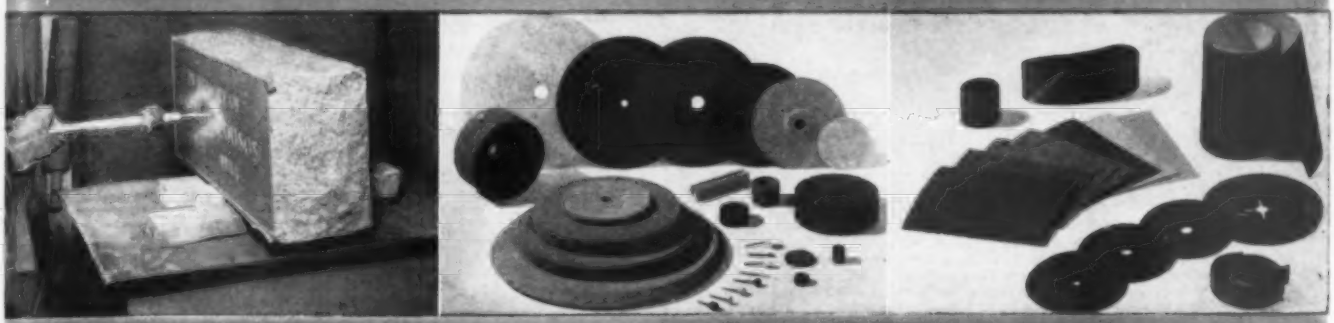
In surface grinding (straight wheel reciprocating or vertical spindle cups, cylinders or segments) on steel, we doubt if there is any likelihood that loose grit particles would impregnate the work piece.

In surface grinding of soft metals such as aluminum or brass or materials such as plastics, on straight-wheel reciprocating surface grinders, there is a remote possibility that loose grit particles might become imbedded in the work piece on the roll cut.

Although a problem such as you have described has never come to our attention, we believe that it might be remotely possible, if sufficient coolant were not directed in such a manner as to remove all swarf and loose grit from the surface of the work piece.

As you may know, it is customary to produce lapping wheels for industry by rolling diamond grit into the surface of copper discs. Inasmuch as discs are produced by imbedding diamond in the soft copper surface, it might be possible, though not likely that an occasional stray abrasive particle might be rolled into any soft material in surface grinding operations.

METAL POLISHING | GLASS POLISHING | GRANITE POLISHING



PRESSURE BLASTING | GRINDING WHEELS | COATED ABRASIVES

There is an EXOLON Abrasive

to meet EVERY Finishing Requirement

Whatever the product, whatever the desired finish . . . there is an EXOLON Abrasive that produces the desired results quickly, uniformly and at lowest costs.

Abrasive Grain: EXOLON (Aluminum Oxide) and CARBOLON (Silicon Carbide) are accurately graded, free of iron impurities and well shaped for liquid blasting, barrel finishing, air blasting or wire sawing. There is an EXOLON Abrasive Grain for fast cutting, finishing or polishing all metals and for such materials as glass, stone and plastics.

EXOLON also makes quality controlled abrasives for the manufacture of grinding wheels, refractories and coated abrasives.

For the best in abrasives always specify EXOLON.

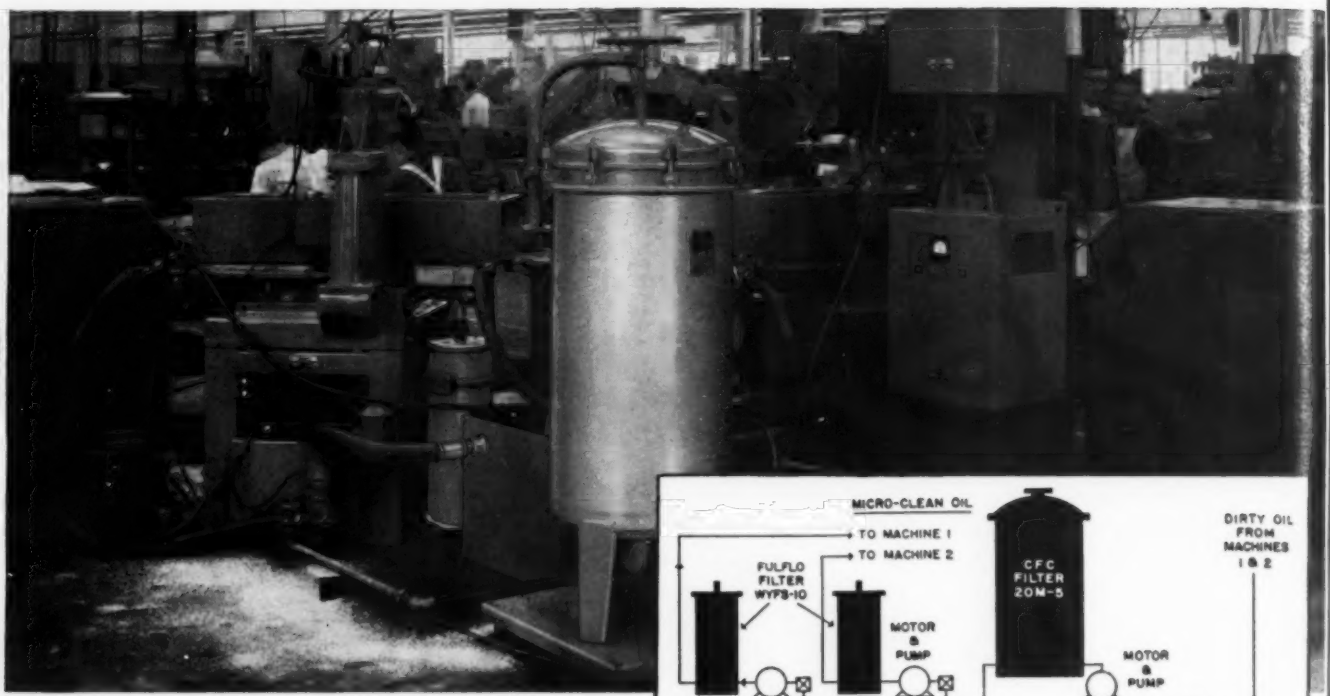
In our three laboratories we have complete facilities for research and development on abrasives and their use. Our technical staff will be glad to assist on any problems in the use of EXOLON or CARBOLON.

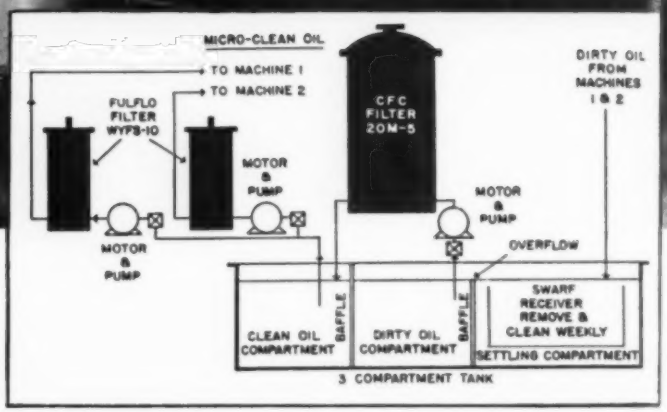
The EXOLON Company

1002 East Niagara Street • Tonawanda, N.Y.
Thorold, Ontario, Canada

Manufacturers of SILICON CARBIDE and ALUMINUM OXIDE ABRASIVES

Use postpaid card. Circle No. 209





Elox metal disintegrating machines in use at Wales-Strippit Company must have clean, sediment-free, dielectric cutting oil. Oil is pumped through CFC Honan-Crane Filter, equipped with Cranite (fuller's earth) cartridges, to remove colloidal contaminants that can not be removed with inert-type filters. It is then pumped on a full-flow basis through Fulflo Filters to the Elox Machines. This filter combination maintains the oil essentially free of all contaminants. Clean oil allows the Elox Machines to operate at their maximum efficiency.

WALES-STRIPPIT gains 2 production hours per day—per machine—with *Fulflo* and *CFC* Filters

Here's how Wales-Strippit Company solved the problem of costly downtime — and also assured superior quality of holes cut with Elox Disintegrating machines. First, they switched to CFC Honan-Crane Multi-Cartridge Filters with Cranite (fuller's earth) elements. This removes both solid and dissolved impurities to assure micro-clarity. Oil is then fed to the electrode area through Fulflo Filters, with Honeycomb Filter Tubes, to remove any micro-contaminants that may have entered the system after the initial filtration.

Result? Downtime to change filter elements for each machine was reduced from 20 minutes every 3 to 4 hours — to 20 minutes once each week. This saving in downtime permits an extra 2 hours of productive time per machine, per day (for three 8-hour shifts). In addition, micro-clarity of the oil prevents any nicks in the cut surface and enables the machines to hold close tolerances between the electrodes and work areas.

Fulflo Filters provide true depth filtration to any degree of micro-clarity for all types of industrial fluids — oils, liquid fuels, liquid chemicals, compressed air, CO_2 and other gases; for high or low flow rate, pressure, *p*H, temperature, or viscosity. CFC Honan-Crane Filters are designed for bypass application, coolant clarification, magnetic separation, and many other uses.

Send for technical literature or engineering assistance to Department **GF**

COMMERCIAL FILTERS CORPORATION
MELROSE 76, MASSACHUSETTS
PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA

MICRO-CLARITY AT MINIMUM COST

Fulflo Filters — *with genuine Honeycomb Filter Tubes for controlled micro-clarity of industrial fluids.*

CFC Filters — *Selective filtration of oils • water-oil separators • magnetic separators • pre-coat filters • coolant clarifiers • automatic tubular conveyors.*

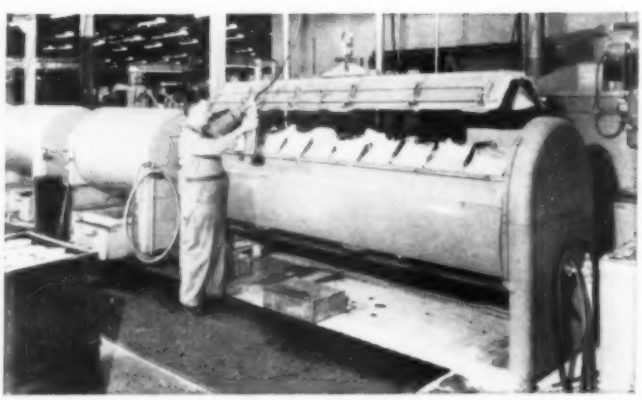
Use postpaid card. Circle No. 210

Techline tailors finishing service to fit industry needs

Old concepts of precision finishing, like the steam locomotive, are fading fast from the production scene. New ideas are replacing the old, as exemplified by Techline's **total** precision finishing service.

Techline, alone in the industry, offers equipment and supplies for **both** important processes of precision finishing — the barrel finishing and wet blasting methods. This means that Techline engineers can be completely unbiased and objective in recommending the means of solving any given problem in close-tolerance finishing. This broader scope of Techline service fills a major need of precision finishers. It puts precision parts processing on a truly scientific basis, through which results can be accurately forecast and measured.

A leading aircraft and missiles parts manufacturer (below) uses Techline barrel equipment for finishing to .0001" tolerances. A Techline-Liquamatte cabinet (top) wet-blasts marine diesel engine cylinder liners prior to chrome plating.



If you want a lower-cost method of obtaining the precise finishing results you need, call on Techline — where precision finishing is a science.

Techline shatters an industry's traditions — makes precision finishing a science.

"You asked for it" — Techline built it

You-asked-for-them features are evident in the design of all Techline equipment. Model 30, for example, is typical of Techline standard barrel finishing machines. It comes in 20 sizes having 1 to 6 compartments, from 5 to 30 cu. ft. capacity.

New ideas include the streamlined styling, "good-housekeeping" design leg supports, retractable fiberglas safety gate, safety switch, and centralized, push-button control panel. Full-opening doors make loading, unloading and cleaning operations easier. Cylinder shafts, machined **after** they are welded into position, assure positive alignment and balance, promote noiseless, vibration-free operation. For full details, write for our new Bulletin No. 200.

Techline removes mystery from media and compounds

Techline specialists have simplified your problems of selecting compounds for precision barrel finishing, with the Techline line of Chempounds. Instead of 15 or 20 formulas, Techline has developed nine standard Chemical compounds which meet the bulk of all barrel finishing needs.

Another 90 or more special formulas are available, offering particular advantages for specific finishing problems. But the nine basic Chempounds meet most requirements for deburring and radiusing, cutting down, descaling and corrosion removal, polishing and burnishing.

You save with Techline, too, because you can obtain all your media and compound needs from one convenient source, combining purchases for attractive quantity discounts and freight allowances. For full information, write for bulletin 89.

Techline
division of **WHEELABRATOR** CORPORATION

2452 Avenue V, Vicksburg, Michigan

Use postpaid card. Circle No. 211

Toolmaker's Skill is the marvelous science of making things fit.

Making tools for toolmakers

Gage Blocks, so important to toolmaker's precision measurements, obtain their own close accuracy through the use of Norton lapping machines. Norton lappers are among industry's most valuable "fit and finish" tools.

Die Making gets increasingly delicate as the work nears the finish. Here the toolmaker adds his final touch, using a Norton tiny grinding wheel — preferred because his work must be perfect.

Touching Up a high speed milling cutter is often done with an India brand oilstone file. Final honing is frequently done with an Arkansas oilstone file. Norton and its divisions are the important sources for both.

Micrometers Themselves are a product of precision manufacture and precision-prepared abrasives. Here a man is grinding a micrometer thread die with a Norton V-face grinding wheel. There are more than 200,000 types of Norton grinding wheels.

Making better products...

s puts a man on his mettle

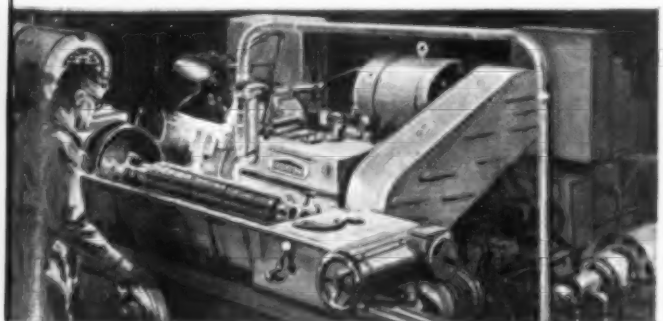
Inventing a tool to make other tools better was the work of an unknown prehistoric genius. A nice start!

Thousands of years later — here at Norton Company — a constant improvement of tools for more efficient production is still going on. Bigger, better and more important as science opens new vistas. Based on this invention, toolmaking has become a great industry serving all industry.

Norton abrasives are chief among "toolmakers' tools" — respected and preferred wherever toolmakers are at work. It is this craft of the toolmaker that turns the designer's ideas into practical production implements.

On this page are a few of the many modern ways in which Norton helps the man who uses the micrometers. Further along — on the production line — Norton abrasives keep the work coming out as it should. This is how Norton serves — making better products . . . to make your products better.

NORTON
ABRASIVES



Precision Finishing to extremely close tolerances is possible on this large Norton grinding machine. Precision engineering gave it a "feather touch". Here a machine spindle is being finished to an accuracy of plus or minus 1/10 of a thousandth of an inch.

Around the world and still expanding

Grinding Wheels Plants — Worcester, Mass.; Santa Clara, Calif.; Hamilton, Ontario; South Africa; England; France; Germany; Italy; Brazil.

Behr-Manning Plants — Coated Abrasives and Pressure-Sensitive Tapes — Troy, N. Y.; Canada; Australia; France; Northern Ireland; Argentina; Brazil.

Abrasive Plants — Huntsville, Alabama; Chippawa, Ontario; Cap-de-la-Madeleine, Quebec; Brazil.

Grinding and Lapping Machine Plant — Worcester, Mass.

Refractories Plant — Worcester, Mass.

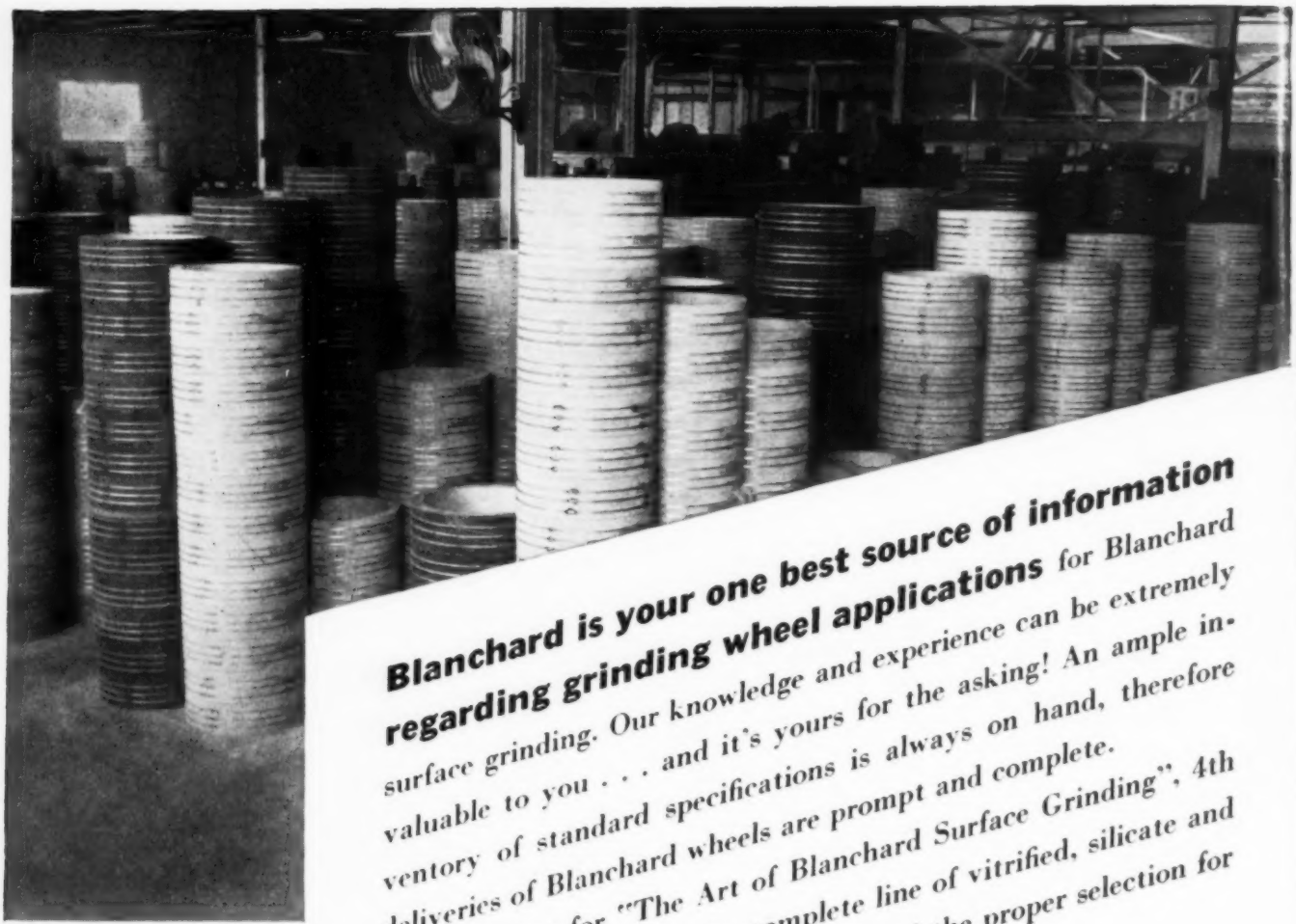
Electro-Chemical Plants — Chippawa, Ontario; Huntsville, Alabama; Cap-de-la-Madeleine, Quebec.

Norton Pike Plant — Sharpening Stones — Littleton, New Hampshire.

Bauxite Mines — Bauxite, Arkansas.

General offices: **Norton Company, Worcester, Mass.**

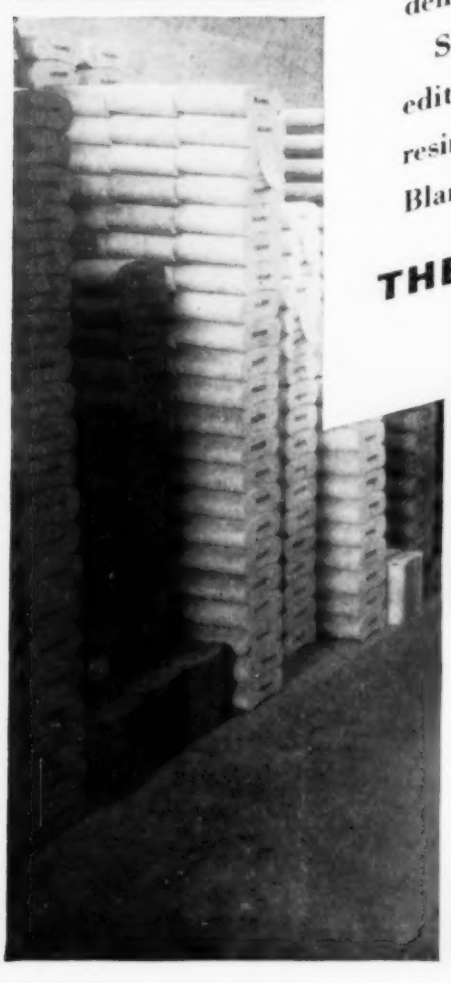
o make your products better

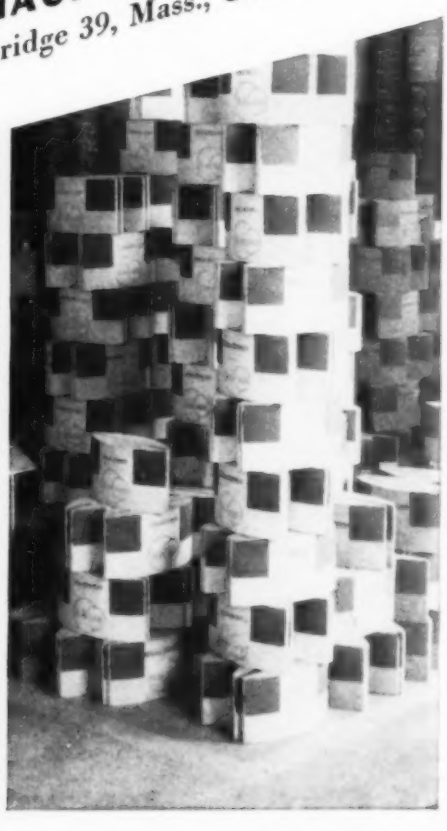


Blanchard is your one best source of information regarding grinding wheel applications for Blanchard surface grinding. Our knowledge and experience can be extremely valuable to you . . . and it's yours for the asking! An ample inventory of standard specifications is always on hand, therefore deliveries of Blanchard wheels are prompt and complete.

Send today for "The Art of Blanchard Surface Grinding", 4th edition, which describes the complete line of vitrified, silicate and resinoid bonded wheels and segments and the proper selection for Blanchard vertical spindle surface grinders.

THE BLANCHARD MACHINE COMPANY
64 State Street Cambridge 39, Mass., U.S.A.





Use postpaid card. Circle No. 213

Can parts this small be barrel finished?

Dime shows relative size of typical bearing races.

Twin-barrel Almco Supersheen Model DBO-1A used by Miniature Precision Bearings to process tiny bearing assemblies. It's the ideal machine either for small lots of parts or large lots of small parts.

EMPHATICALLY, YES!
For example, precision deburring and finishing of small parts with ALMCO barrel finishing equipment is an important operation at the modern new plant of Miniature Precision Bearings, Inc., Keene, N. H.

M.P.B. makes miniature ball bearings, some with assemblies so tiny that 500 can be carried in a thimble. ALMCO precision barrel finishing equipment and methods are used to improve surface finish on the inner and outer races, as well as removing burrs, sharp edges and machining lines.

Production usually runs from 1,000 to 4,000 parts per load, and occasionally at from 5,000 to 15,000 parts per load.

SEND FOR FREE 52-PAGE BOOK . . .

Modern precision barrel finishing processes completely described. 52 pages of facts, photos, data and cost comparison charts. Send for your free personal copy today.

All told, millions of parts annually are finished the ALMCO way at Miniature Precision Bearings!

If you have a finishing problem with your parts, small *or* large, perhaps ALMCO has the answer. It's easy to find out. Just write us on your letterhead asking for an ALMCO sales engineer to call. He will arrange for your product parts to be run through detailed sample processing to determine what combination of machine, compound, media, cycle, etc., will produce the results you want, at lowest possible cost.

Or, if you prefer, send sample parts and specifications on results desired direct to ALMCO's main laboratory at Albert Lea, Minnesota.

ALMCO

Queen Products Division • King-Seeley Corporation

133 E. Main St. • Albert Lea, Minnesota

Sales and Engineering Offices in Chicago, Detroit, Los Angeles, Newark, New Haven and Philadelphia

IN ENGLAND: Almco Division of Great Britain, Ltd., Bury Mead Works, Hitchins, Herts, England

Use postpaid card. Circle No. 214

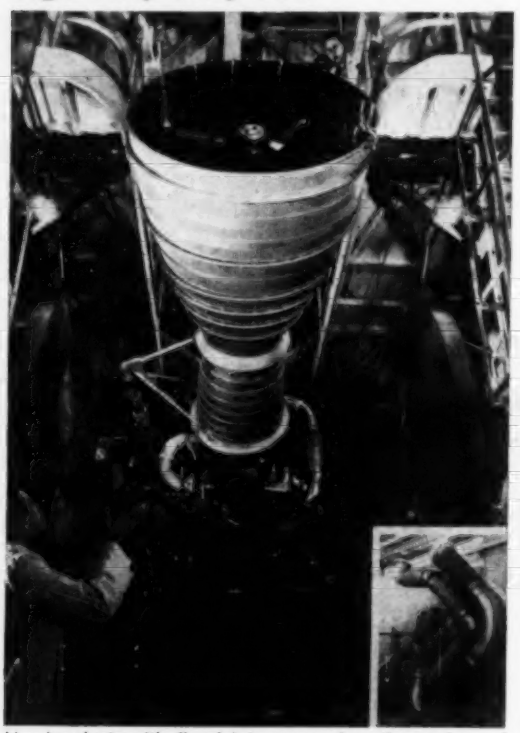
Metalworking in General

GE's Kennedy Stresses Man-Made Diamonds

With man-made industrial diamonds of superb quality for abrasive purposes coming into plentiful supply, there is a far greater field of uses for the product than industry realizes, according to J. D. Kennedy of Detroit, Manager, Diamond Section, Metallurgical Products Development, General Electric Co. He presented a paper before the Industrial Minerals Division of the Society of Mining Engineers, a constituent organization of the American Institute of Mining, Metallurgical, and Petroleum Engineers, at the AIME national convention.

Kennedy deplored industry's slowness to adopt superb-performing synthetic abrasive that now is in plentiful supply, and attributes the situation to limitations on natural supplies in the past. Industry was urged to reappraise its uses of diamonds.

High Temp Alloy Used



Massive ducts with flex joints are used on the engines of the Atlas, Thor, Jupiter and Redstone missiles now under development at Rocketdyne, a Division of North American Aviation, Inc. (Canoga Park, Calif.). The metal, A-286, used in this duct work, is a special high temperature alloy used for a low temperature application. The alloy is made by Allegheny Ludlum Steel Corp. of Pittsburgh. The ducts must carry liquid oxygen from the pump to the thrust chamber. The temperature changes encountered in doing this are from a —297° F. to a plus of several hundred degrees F. The mechanics pictured are aligning the thrust chamber of the engine, which will be used on the U. S. Army Jupiter intermediate range ballistic missile.

Western Metal Exposition Convenes March 16-20, 1959

A widespread showcase of new developments for immediate application by the West's metals industries is the description given the 11th Western Metal Exposition by Ray T. Bayless, Acting Secretary and temporary Manager, American Society for Metals, Cleveland. Dates for the educational display in Los Angeles Pan-Pacific Auditorium and combined pavilions will be March 16-20. At the same time the

Announcing for the missile era:

3 new toolroom aces

Accuracy to the split-tenths

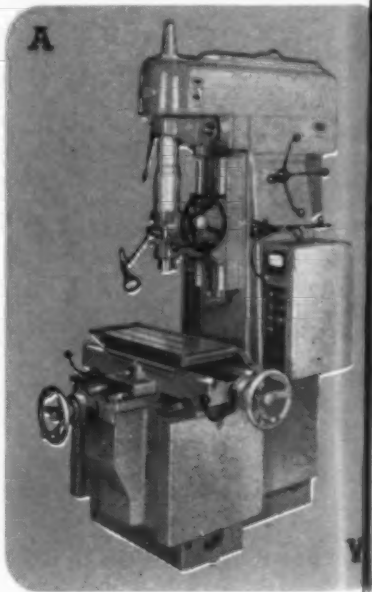
FLASH! All Moore machines shipped after February 15, 1959 are made and calibrated to the New International Inch

DETAILED LITERATURE ON EACH OF THESE MACHINES IS AVAILABLE ON REQUEST.

LOCATES AND BORES HOLES TO LESS THAN A "TENTH"

No. 3 Moore Jig Borer

For boring, drilling, reaming and spot holes in dies, jigs and production parts, speed and accuracy of the Moore Jig B has never been equaled. Now, with this and larger No. 3 model, you will break "tenth" barrier! Here's why: it offers precise positioning tolerances...all harden ground and lapped ways...no gibs...no o hang...improved drive...wider speed ra 60 to 2250 RPM...larger table working face, 11" x 24"...micro setting of ver dial...more accessible cross-clamping. Th new features, plus sensitive, centralized trols for spindle speeds and feeds, quick changing, easy lubrication add up to a Borer which belongs in every toolroom wh *tomorrow's* accuracies must be achieved to



MOORE TOOLS Manufactured

11th Western Metal Congress will hold technical sessions in Los Angeles' Ambassador Hotel. There will be more than 350 exhibiting firms in the auditorium and pavilions, revealing industrial and metals progress.

Tool Engineers Focus on Planning at April 18-22 Meeting

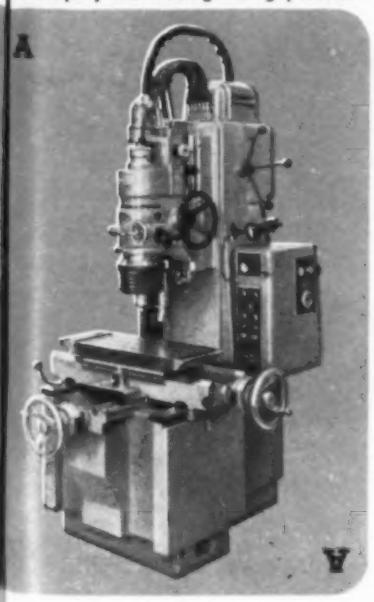
"Planning for Profit" is the theme of the 40,000-member American Society of Tool Engineers' Annual Meeting, April 18-22, at Milwaukee's Hotel Schroeder. Thirteen technical sessions are scheduled.

One of the high points will be the Honor Awards Dinner and Third Annual Eli Whitney Memorial Lecture. Swan E. Bergstrom, President of the Cincinnati Milling Machine Co., will deliver the lecture, having been chosen for this honor in recognition of "demonstrated superiority in the quality of his achievements and caliber of his professional service to the tool engineering profession, to industry and to the American standard of living."

LOCATES AND GRINDS HOLES TO LESS THAN A "TENTH"

No. 3 Moore Jig Grinder

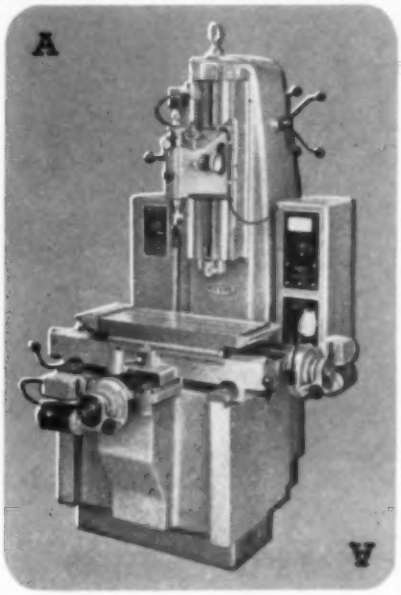
originators of jig grinding and the Jig inder have done it again! Now, with this w, larger No. 3 model, you can grind—h split-tenth accuracy—holes plus regular d irregular contours to size and location er hardening. This is made possible by the ser locational tolerances built into the ma- ine... by the all-hardened-ground-and- ped ways... by the faster strokes provided chop-grinding... by the infinite spindle eeds, 40 to 250 RPM... by the larger table rking surface, 11" x 24". The same quickly precision lead screws as in the Moore Jig er simplify the finish-grinding process.



MEASURES TO ONE-THIRD OF A "TENTH"

Moore Universal Measuring Machine

This machine, built on the same basic principles as the No. 3 Moore Jig Borer and No. 3 Moore Jig Grinder, introduces a new concept in ultra-precise measurement and inspection. It offers *for the first time*: A machine combining the capacity for larger work-pieces; choice of electronic indicator supported on an accurate, rotatable spindle, or a universal microscope for pickup; a combination of rectilinear and angular positioning, making possible the measurement of the most complex contours. Design and construction insure the highest possible accuracy. All ways are hardened, ground and lapped steel, fitted to hand-scraped cast iron. Table positioning in two directions of travel is by means of master lead screws. Note motorized lead screw drive—it's optional (for Measuring Machine only).



MOORE SPECIAL TOOL COMPANY, INC., Bridgeport, Conn.

Use postpaid card Circle No. 215

New Scientific Approach to Marketing Needed

The only hope for continued growth of the American economy in the face of the Soviet challenge, is a new scientific approach to the problem of marketing and distributing consumer goods, Fenton B. Turck, marketing expert, stated in speaking to a group of marketing specialists in New York.

"Through the application of engineering techniques, we have solved the problem of increased industrial output. Now we must apply the same engineering approach to that vast area of our economy known as marketing or distribution," Turck said.

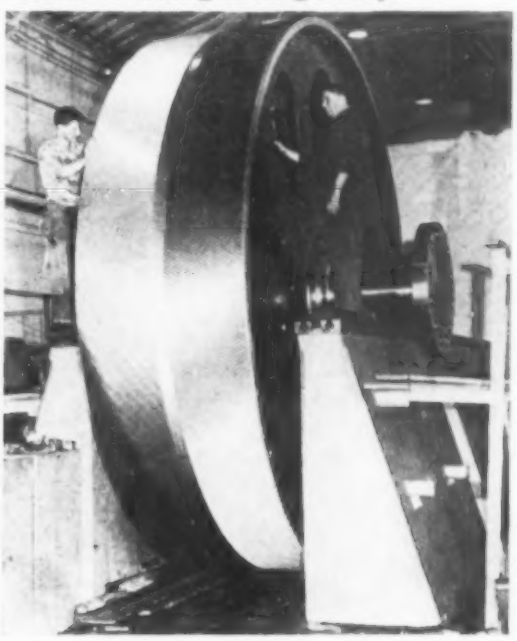
Space Ships & Rockets Subject of March Aviation Conference

Manned space ships, new developments in rocket propellants and the latest jet transport planes will be featured topics at the 1959 Aviation Conference in Los Angeles, March 10-12, sponsored by The American Society of Mechanical Engineers.

Experts will review current and projected efforts to place a man-carrying rocket in space, supply it, and bring its occupant back to earth. Among the problems they will consider are how to supply space ships with power for radio and other auxiliaries, the relative merits of nuclear and chemical fuels, and how to use satellites as staging platforms for journeys farther into space.

Copies of the program and registration forms are available from the Meetings Department, ASME, 29 West 39 St., New York 18, N.Y.

Gearing Up For First Atomic Passenger-Cargo Ship



The 70,000-lb. bull gear which will drive the world's first atomic merchant ship nears completion at De Laval Steam Turbine Company's plant at Trenton, N.J. The big main drive gear measures 176" in diameter, 48" across the gear face. It is the largest unit of the N.S. "Savannah's" propulsion machinery which will be tested this month at De Laval before installation in the hull. The launching of the N.S. Savannah is now expected sometime in late summer this year. The 587-foot hull is being built in the yards of the New York Shipbuilding Corp., Camden, N.J.

Specify your finish...

enforce it with the Brush Surfindicator!

With the Brush Surfindicator you can hold finishes *exactly* to specifications. No costly rejects. You get a specification finish at minimum cost! The Brush Surfindicator with its full range of accessories precisely measures any finish regardless of whether it's rough, smooth, in a hole, on a concave or convex surface—even on a razor edge.

Write for booklet "Control the Finish and You Control the Costs." Factory-trained distributors in all major cities.

Our Cost Challenge!

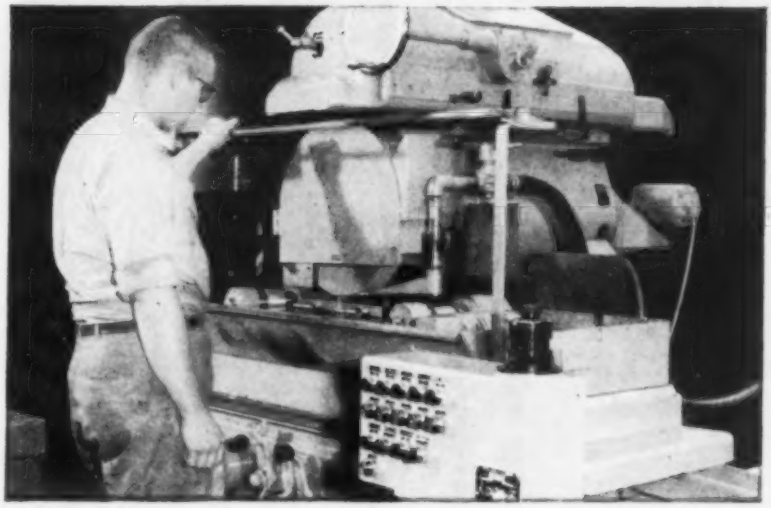
Just invite us to bring the Surfindicator into your plant—put it to work on a machine—and we will prove that we can reduce your rejects. We're ready now!

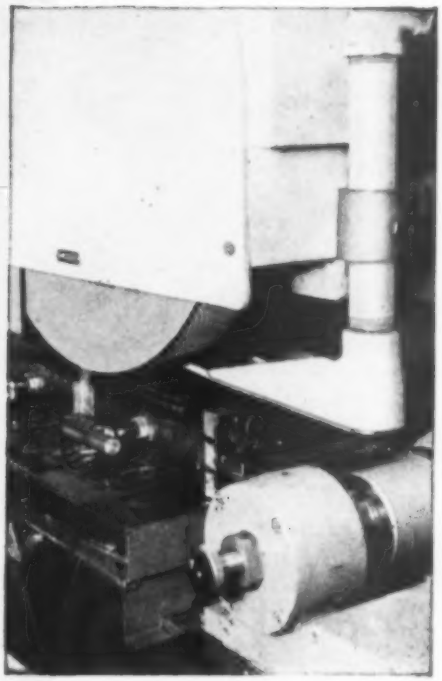
brush INSTRUMENTS
DIVISION OF
37TH AND PERKINS CLEVITE CORPORATION CLEVELAND 14, OHIO

Use postpaid card. Circle No. 216

Thompson — TRUFORMING CUTS COSTS 66%

. . . DOUBLES PRODUCTION AND IMPROVES PRODUCT AT THE OLIVER CORPORATION





In the production of ledger plates, used in the cutter bar of mowing machines, The Oliver Corp. of Chicago, formerly first milled the teeth, then hardened the plate. The hardening process caused distortion and variance in uniformity which impaired the cutting action of the bar.

On the advice of Thompson engineers, a Type BB Truforming Grinder with a 2½" width grinding wheel was installed to process these ledger plates as a finished grinding operation. The plates are now heat treated first and the teeth are then formed by grinding.

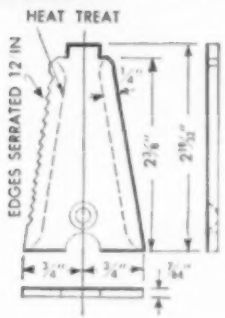
The installation of the Thompson Truforming Grinder has accomplished the following results:

1. **Cut total production costs from $3.18 to $1.06 per 100 pieces.**
2. **Increased the production rate from 1600 to over 3600 pieces per 8-hour shift.**
3. **Provided constant uniformity in the workpieces.**
4. **Eliminated the full-time service of one man.***
5. **A pair of $160.00 milling cutters formerly produced 20,000 pieces. A $60.00 grinding wheel now produces well over 40,000 pieces.**

The leadership of Thompson Truforming Grinders results from 25 years of research and development work in crush form grinding. Today these machines are opening up hundreds of practical, time-saving, profit-improving and cost-cutting applications for industry.

Thompson's engineering experience is available to you without obligation. Write for Catalog T558.

**Automatic machine cycle allows operator time to countersink hole in plate—an operation formerly requiring one man's full time.*



LEDGER PLATE
High Carbon Manganese Steel
Rockwell C52-58

"Keep Thompson in mind for that daily grind"

THE THOMPSON GRINDER CO.
SPRINGFIELD, OHIO

Thompson SURFACE GRINDERS

Use postpaid card. Circle No. 217

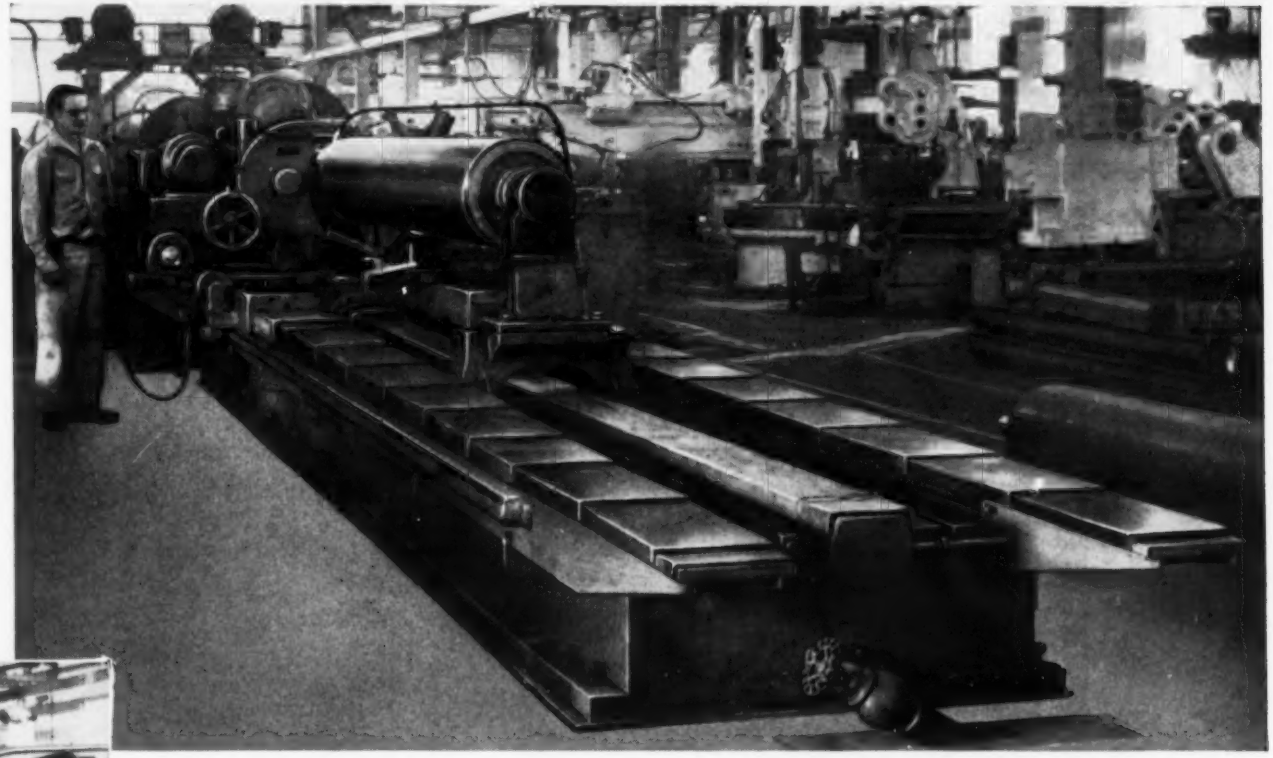
LOBDELL GRINDER

—Latest Addition to Sandy Hill's 10 Year Expansion Program

A Lobdell Roll Grinder, the most modern available, is Sandy Hill's newest acquisition in a ten year retooling program now nearing completion. It will accommodate rolls from 6 inches to 8 feet in diameter.

Sandy Hill has had long experience in studying and recommending proper crowning for rolls in each paper machine section. Now a newly designed crowning device incorporated in the new Lobdell Roll Grinder gives a full range of desirable crown curves.

An automatic wheel infeed compensates for wheel wear on chilled iron to eliminate the inaccuracies that are the most common cause of uneven caliper in the finished paper sheet.



- Massive bed and carriage construction.
- Inverted Vee-ways . . . stronger, better lubricated.
- Crowning device . . . designed to give full range of desired crown curves.
- Choice of A.C. or D.C. electrical equipment to suit your mill needs.
- Quick wheel change made easy with grinding wheel mounted on end of wheel spindle.
- Full way protection with metallic telescoping covers.
- Handwheel control on side of wheel-head permits observation of work while feeding wheel.
- Coarse and fine feed of wheel at operator's choice.
- Automatic wheel infeed to compensate for wheel wear on chilled iron.
- Self-contained wheel spindle . . . forced feed lubrication with oil pressure control.

A New LOBDELL Roll Grinder Means FASTER GRINDING

plus:
- PRECISE CROWNING
- BETTER SURFACE FINISH
- MAXIMUM ACCURACY ON BOTH IRON AND RUBBER COVERED ROLLS

UNITED
ENGINEERING AND FOUNDRY CO., 948 FORT DUQUESNE BOULEVARD, PITTSBURGH, PENNA.

Use postpaid card. Circle No. 218

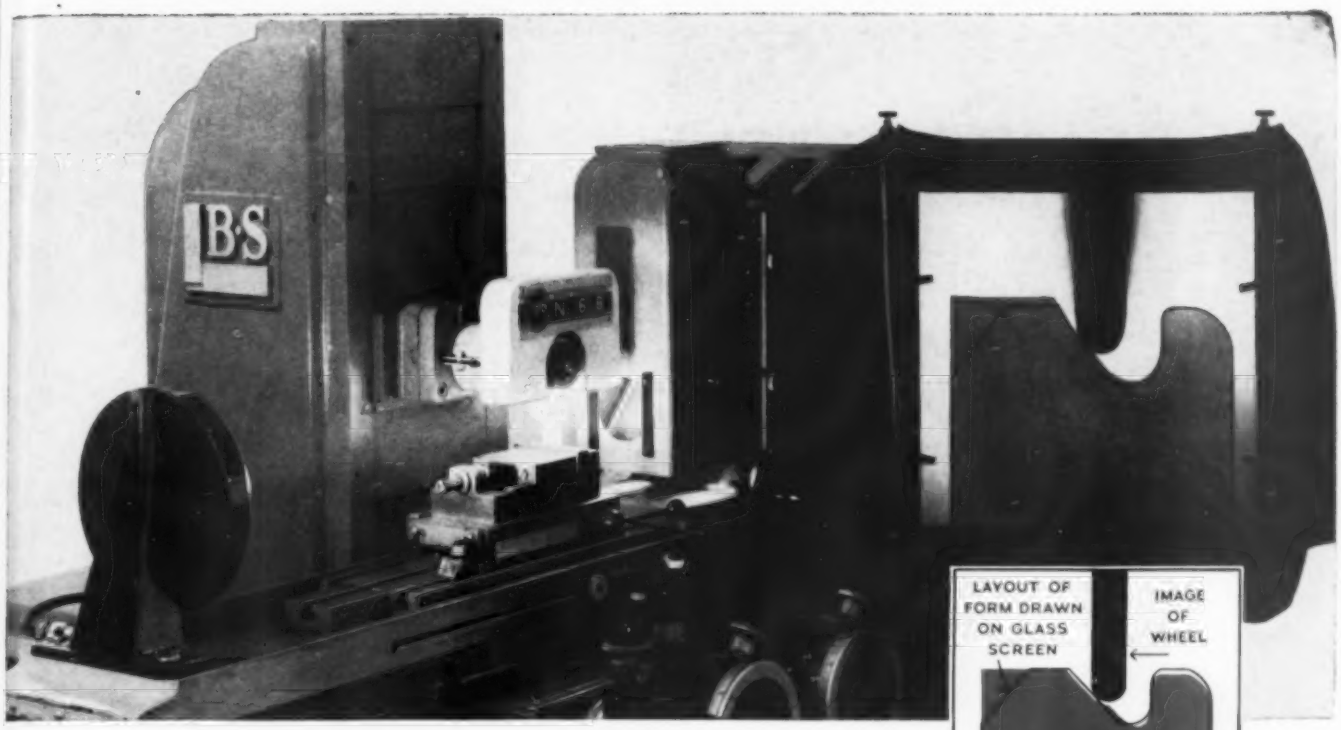
NO
spe
tra

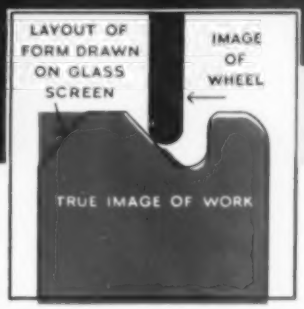
UP
op
gri
on
wo

10
of
tio

HA
ter
eq
bi

BI
gr
be





Saves 50% or more in contour grinding costs

. . . the Brown & Sharpe MICROMASTER Visual Grind

NO TIME OUT to remove work for frequent inspection with separate equipment. Clear, magnified *true* image of work and wheel constantly in view.

UP TO 75% FASTER set-up and grinding by skilled operators. Semi-skilled workers, also, can readily grind accurate contour to match form layout drawn on screen of built-in comparator, which moves with work.

10:1 TO 100:1 MAGNIFICATION — your choice of six different lens systems as required. Magnification changeover takes less than 2 minutes.

HANDLES UNLIMITED VARIETY of through, blind, template, or circular form grinding with standard equipment or simple attachments . . . in steel, carbide, or ceramics.

BIG SAVINGS IN WHEEL COSTS especially when grinding carbide or ceramics. Intricate forms can be followed with a few simple wheels.

With Visual Grind, the built-in optical comparator system, hundreds of tool and die shops are form grinding twice as fast — often save up to 75% of time previously required.

Now, the MICROMASTER Visual Grind brings you these proved advantages *plus* the profit-saving performance of the new Brown & Sharpe 618 Surface Grinding Machine.

For complete information, call or write any Brown & Sharpe machine tool dealer, district office, or: Brown & Sharpe Mfg. Co., Providence 1, Rhode Island.

Hydraulic table speeds of the
NEW Brown & Sharpe
618 MICROMASTER Surface Grinder
provide the smooth longitudinal power strokes essential to Visual Grind efficiency. The operator easily follows form with the transverse and vertical hand wheels, using .0001 feeds when required.

MICROMASTER Visual Grind is one of over 100 modifications of the new B&S 618 available to meet your specific grinding needs.

Brown & Sharpe

MACHINE TOOL DIVISION

MILLING • GRINDING • SCREW MACHINES

MACHINE TOOL ACCESSORIES

B·S

PROGRESS IN PRECISION FOR OVER 125 YEARS

Use postpaid card. Circle No. 219

Portable tools are perhaps the most widely misused of all grinders, from the standpoint of either efficiency, or safety. Control is therefore a necessity to proper portable use.

The Allis-Chalmers Portable Tool Control Program

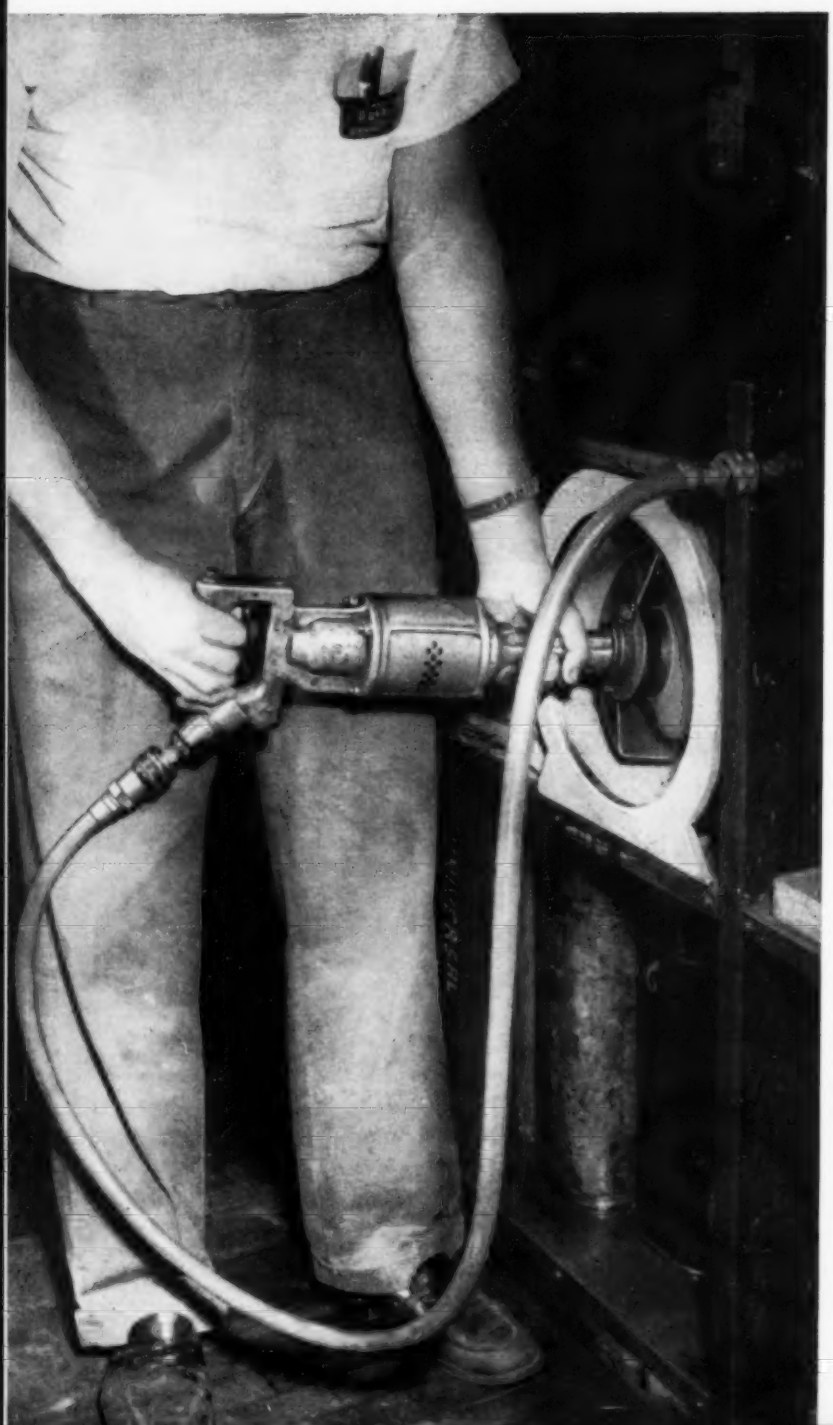


Figure 1. "Bomb shelter" ready for use. The operator has mounted 8" x 1½" x 5/8" Type IH-face special wheel on the grinder and is about ready to turn on the air for the test. To show the wheel and the guard in the tank, the operator is somewhat out of normal position. Usually, he would be turned more to the right, so that the wheel guard gives him added protection and the fragments of the wheel, in case of breakage, are thrown toward the right rear corner of the tank.

BY JESSE G. SDANO
Maintenance and Tools Section
West Allis Works
Allis-Chalmers Manufacturing Company

● An intensified safety program for portable air grinders, known as the Air Tool Control Program, has now been under way for about three years at Allis-Chalmers West Allis Works. Standard safety regulations for the operation of these portable tools, of course, have been in effect for many years. They were revised in 1949 when the plant safety booklet was reissued.

The Air Tool Control Program, however, was initiated to make portable grinding even a safer operation than it had been, and the record was by no means bad. To date, it has achieved that objective and it has more than repaid the investment of time and money that has been made.

In the West Allis plant there are over 500 portable air grinders in 18 different departments. These are stocked in tool cribs located in each department. Not all of the grinders are in daily use but most of them are.

Since a wide variety of industrial products are produced at Allis-Chalmers West Allis Works, numerous different kinds of grinding wheels are required. These range from small arbor mounted ¾ inch diameter wheels to 8 inch diameter type No. 1 straight grinder wheels. The principal types and sizes utilized, however, are 5¾ inch diameter cup wheels and 9 inch diameter depressed center discs used on right angle grinders, as well as 6 inch diameter type No. 1 straight wheels and 2¾ by 3/16 inch thick rubber-reinforced cut-off wheels used on straight type air tools.

Briefly, the major items of the program can be summarized as follows:

1. A thorough instruction of the toolcrib attendants as to proper procedures and then limiting the selection, mounting and testing of grinding wheels and the checking of air tools to tool crib attendants.

Figure 2. Mounting a wheel on a grinder. Care must be taken to see that the full length of the nut is threaded on the shaft and that the nut is not so tight as to crack the wheel.

2. Developing and distributing the instruction necessary to supplement the training given to the toolcrib attendants.

3. Restricting approval of grinding wheel requisitions to tool and maintenance supervision, who are familiar with the wheels and the tools on which they are used.

4. Providing each tool crib with the necessary tools and equipment for wheel mounting and testing.

5. Providing for the necessary follow-up to insure compliance with the program.

A necessary prerequisite to a program such as this is to insure that all existing tools are in working order. This was accomplished by a general inspection of the air tools to determine whether the grinding wheels were properly mounted and guarded, and whether the safe operating speed of the wheel corresponded to the operating speed of the airtool. Corrections were made as specific unsafe conditions were uncovered.

A member of supervision was assigned to instruct toolcrib attendants in correct procedures and to follow up the program. At the same time, rules were established and instructions issued regarding the use, maintenance and inspection of portable air tools in the tool cribs. While these in general were at least as stringent as the recommendations of the National Safety Council in the American Standard Safety Code for **The Use, Care and Protection of Abrasive Wheels**, and met the requirements of the Wisconsin State Industrial Commission, it was possible to make them much more precise, since they applied only to one plant.

Assigning toolcrib attendants to perform the routines of mounting and testing of grinding wheels and checking the portable tools was not an unusual change. Such responsibilities fall as well with the normal duties of such employees as they do with the duties of production employees.

Selection of tool and maintenance supervision for approval of requisitions was similarly motivated. As indicated above, these supervisors are most likely to be familiar with the capabilities and limitations of portable grinders and the wheels used on them, and they can be more objective about the use of tools.

Providing each tool crib with the necessary tools and equipment for mounting and testing, of course,

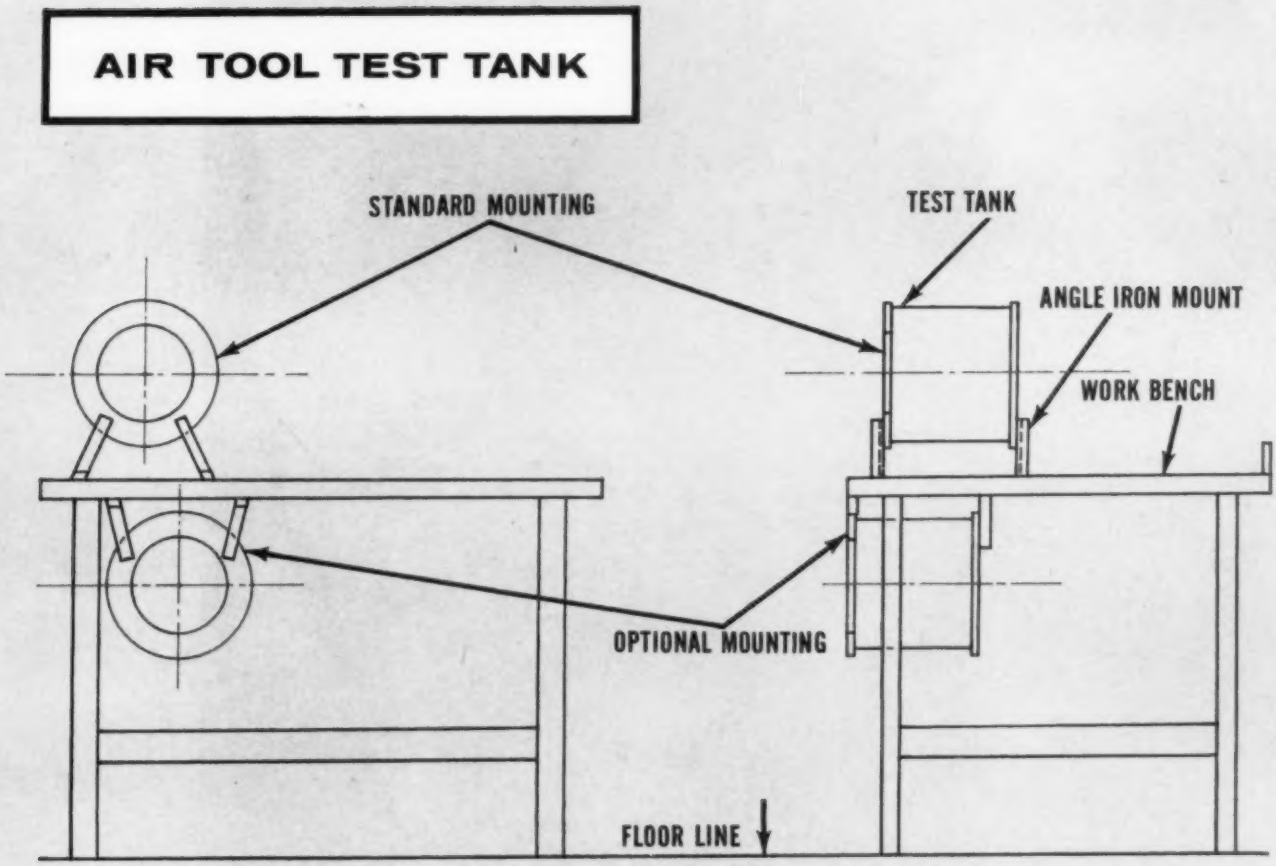


Figure 3. A working sketch of the air tool test tank or "bomb shelter." Angle iron mounts are added as necessary, depending upon the location in which the tank is to be installed.

follows an established principle—that we tend to comply with regulations that are easy to comply with, and that one way to insure proper equipment is used is to have it readily available.

In addition to the tools and equipment illustrated in Fig. 1, the program provided for furnishing work benches, vises and special vise jaws where these were not available. A unique addition, however, was the providing of a special "bomb shelter," a specially designed unit in which wheels could be tested on grinders after mounting.

The recommendation that wheels newly-mounted on a portable grinder be brought up to speed and run for a minute or so inside a casting or under a heavy table is a familiar one. Providing a special unit for this kind of testing represents a new approach. As will be seen from the sketch shown in Fig. 2, the unit can be mounted either on top or under a work bench. Figs. 3 and 4 show the under-bench mounting. This has the advantage of leaving the work surface of the bench free for other uses.

The "bomb shelter" or test tank is essentially a 9" length of 12" diameter $\frac{3}{8}$" pipe with a $\frac{1}{2}$" plate $13\frac{1}{4}$" in diameter welded to the back and a rim of similar size welded to the front.

The dimensions are not critical. The essentials of such a unit are that it be big enough to accommodate any wheel which will be used on a portable grinder in the shop, heavy enough to stand the shock if a wheel disintegrates, and closed in sufficiently to contain the pieces of the wheel.

This report of an airtool control program which has been in operation for nearly four years contains ideas of interest to every user of portable grinders, either air or electric. Safety is a critical point for portable tools.

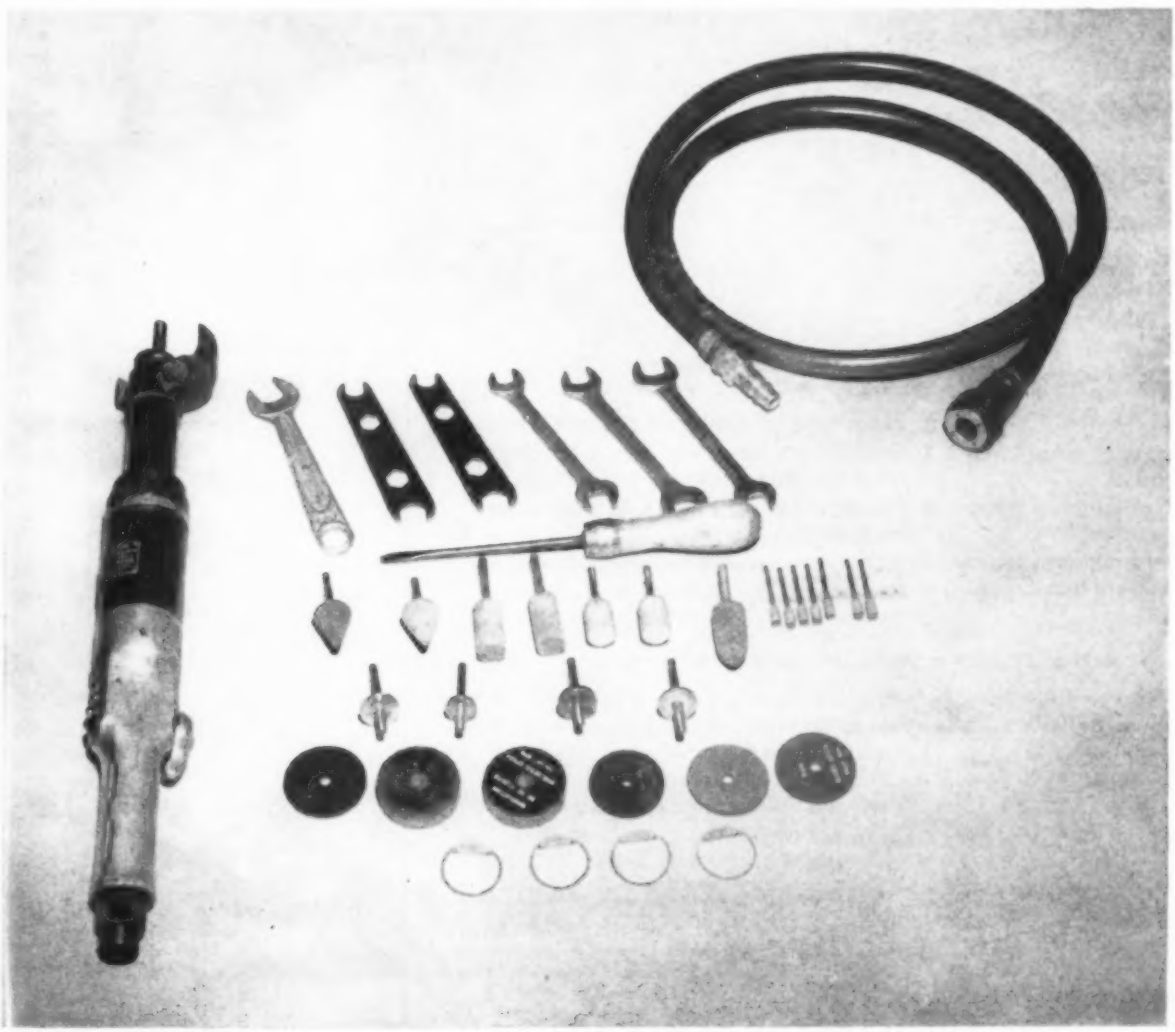
The instructions to toolcrib attendants, supplementing their formal training, were as follows:

1. All portable grinding tools are to be legibly marked to indicate the spindle speed of the tool in rpm as established by the manufacturer. This marking should be shown on the tool identification tag or clearly stamped on the housing, which ever is more practical.

2. All wheel mounting flanges are to be checked. These must be matched relieved flanges not less than 1/3 the size of wheel and must be in good condition. Cut washers, lock washers, etc., are not to be used under any condition.

3. All portable grinders are to be checked for guards and proper guards must be provided.

Figure 4. A typical set of tools assigned to toolcribs at Allis-Chalmers West Allis Works to service portable grinders.



(continued)

4. Any defective tool, or one suspected of being defective, must immediately be sent to the Maintenance Department for repairs.

5. Toolcrib attendants must check all grinding wheels at time of disbursal or at time of mounting on portable grinders; first by the standard ring test and then for condition of blotters and manufacturers' maximum wheel speed markings.

6. Defective wheels or wheels not legibly marked with rated wheel speed must be disposed of. Such wheels are to be immediately broken into unusable pieces in the toolcrib in order to preclude any possible reuse of the defective wheel. If you find any wheels that can be reused, lay them aside and your maintenance foreman will look them over and decide what can be used.

7. Under no condition shall a wheel be mounted on a grinder which has a higher rated speed than the rpm shown on the wheel.

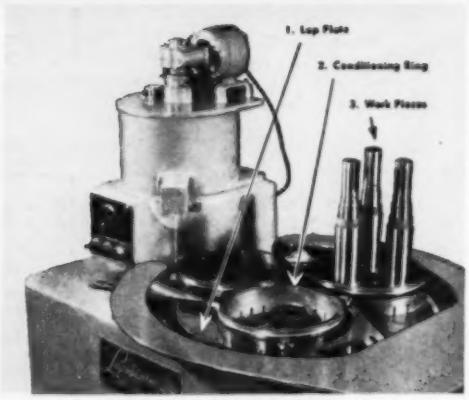
8. When mounting wheels on portable grinders, the clamp nut must be checked to be sure that the full length of the nut is threaded on the shaft. Care should be taken that the nut is not tightened more than is necessary.

9. Upon issuance of a portable grinder which already has a wheel mounted, it will be mandatory to visually inspect the wheel, washers, nut and guard, and to run it in a "bomb proof" before issuance to employee.

This is not regarded as a complete program. One of the possibilities for the future is the development of a color coding system for both grinding wheels and tools, so that it would be possible to instantly check any use of a grinding wheel on a machine too fast for it. Of course, such a system would also go far to assure proper selection of the wheel originally. A second possibility is the development of a test cart which would permit periodic inspection of portable tools on a more comprehensive basis than is now possible. Other studies have been directed toward the design of lighter components, arbors, for instance, which would still allow a sufficient margin of safety. • • •

Quick Facts About PRODUCTION LAPPING

WITH THE Lapmaster®



HOW IT SAVES MONEY

It's the fastest method of *precision lapping* in production quantities or small lots.

Identical parts or parts of various sizes can be lapped simultaneously.

No downtime for truing lap plate . . . conditioning rings automatically keep plate flat.

Frequently eliminates other machining operations.

Rejects cut to a minimum.

Only unskilled operators required.

HOW IT WORKS

1. Heavy cast iron lap plate revolves slowly.
2. Conditioning rings, held in position, rotate freely on plate, keeping lap plate true.
3. Conditioning rings also hold work pieces during lapping cycle.
4. Abrasive compound automatically fed on lap; uniformly distributed under the work pieces.

HOW IT IMPROVES PRODUCTS

You can get flatness to a tolerance of .0000116" or less with absolute uniformity, piece after piece.

Consistently produces surface finishes of 2 to 3 RMS.

No matter what size, shape or form your product is, the Lapmaster will assure you leak-proof, oil tight lapped surfaces at the lowest possible cost on any metals, ceramics or plastics.

Lapmaster ...THE MACHINE THAT PUT PRECISION LAPPING ON A PRODUCTION BASIS

WRITE FOR THE COMPLETE LAPMASTER STORY

Write for bulletins describing the Lapmaster line and chart on measuring flatness.

A product of

Crane Packing Company

6417 OAKTON ST. • MORTON GROVE, ILL. (Chicago Suburb)

In Canada: Crane Packing Company, Ltd., Hamilton, Ont.

Use postpaid card. Circle No. 220

"Quick! . . . A terrific new bonding agent for grinding wheel grits!"

US RUBBER GRINDING WHEELS

Inset shows actual U. S. Lo-Temp Cup Wheel.

Grinding with a corn cob?

It's a fact! In the new U. S. Lo-Temp Cup Wheel, ground-up corn cobs are blended into the batch with some remarkable results:

Greater wheel porosity, thereby preventing the wheel from burning the metal, even at top speeds • greater uniformity within the wheel – and from one wheel to another • greater strength and resistance to wear, therefore, longer life and wheel economy • greater resistance to centrifugal stress.

As any grinding wheel operator will quickly discover, this amazing new "corn-fed" U. S. Lo-Temp Cup Wheel permits him to do a more craftsmanlike job more quickly, more surely, more safely.

The U. S. Lo-Temp is just one of several new grinding wheel developments coming from U. S. Rubber. Get in touch with wheel specialists through U. S. Rubber, 312 N. Hill St., Mishawaka, Indiana, your local "U. S." District office, or by writing us at address below.

US RUBBER

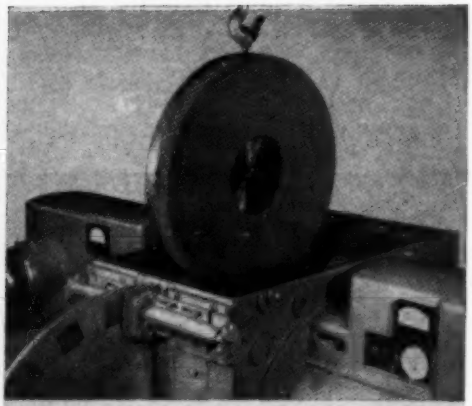
Mechanical Goods Division

United States Rubber

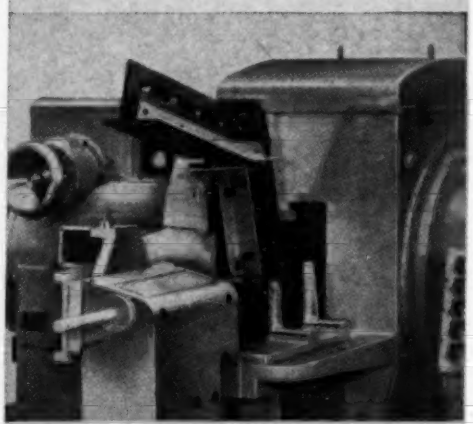
WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

Use postpaid card. Circle No. 221



Simple Abrasive Change thru top of hood cuts down time. Three easy steps take approximately 30 minutes.



Pusher-Type Thru Feeder available. Provides high-volume production on work ⅜" to 7" O. D., and from ¼" to 1⅛" thick.

Oscillator-Type Feeder Fixture also available. For very close accuracy where production volume is not large.

Besly-Titan Abrasive Discs and Wheels are available in a wide range of types and sizes. Experienced Besly Abrasive Engineers are operating nation-wide. For details, write to Besly-Welles Corporation, 20 North Wacker Drive, Chicago 6, Illinois.

NEW BESLY DH4...

Double Horizontal

Engineered to give you all these advanced, proved features

- simplified push-button operation
- accuracy to tenths
- automatic dressing
- automatic sizing
- centralized "one-shot" lubrication
- automatic return of abrasives to grinding plane after dressing or change
- rugged, rigid base
- push-button controlled quill feed
- built-in dial indicators for abrasive movement
- built-in "usable abrasive gage"
- built-in motor load meters
- dial indicator for precise head alignment
- universal head tilting with micrometer adjustment
- concealed wiring and piping

AND MANY OTHERS, **write for Bulletin DH4**

Choose The Features To Meet Your Needs

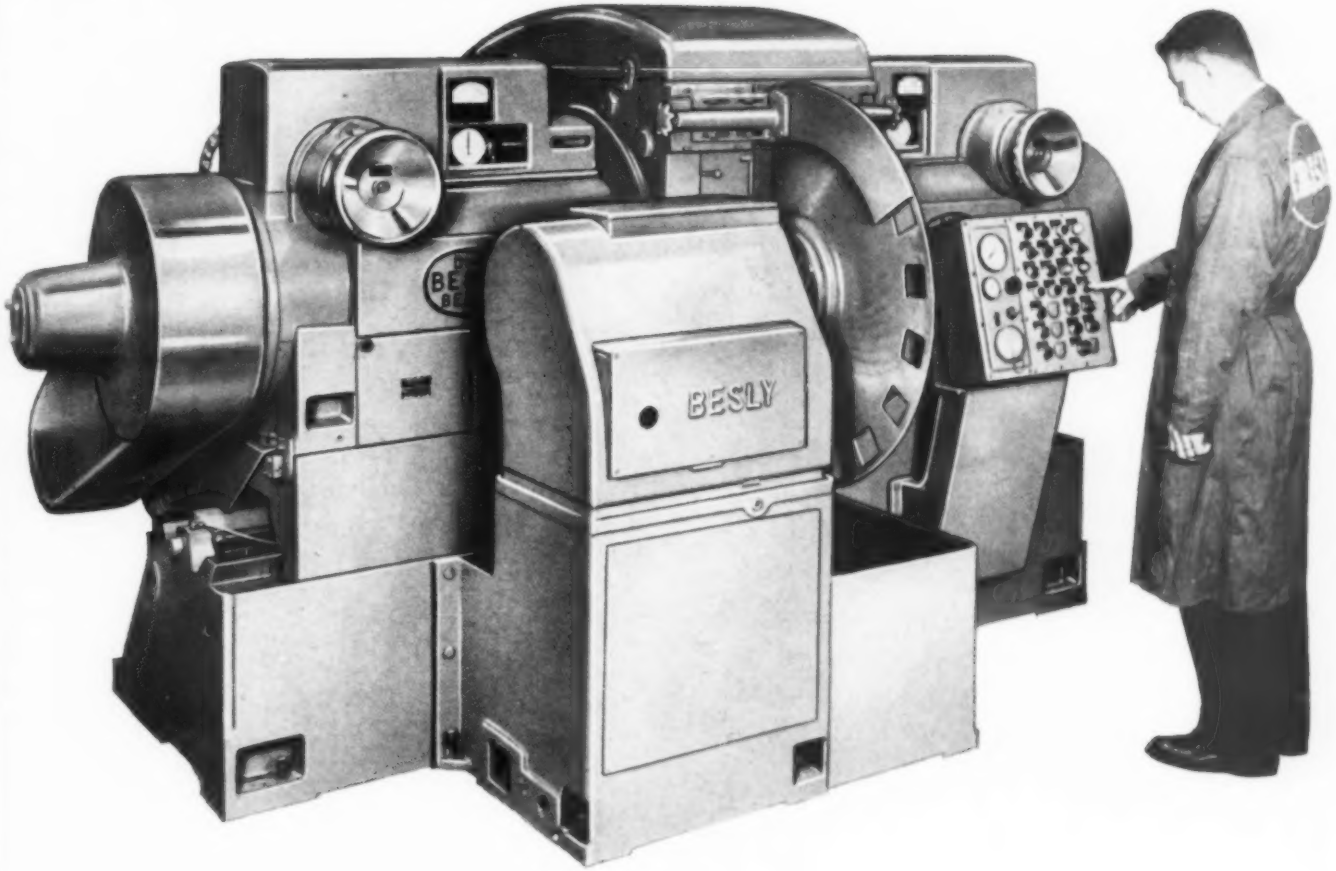
The DH4 Grinder is engineered and specifically designed to provide all the features mentioned here. If some of them are not required for your operations, you can specify only what you need. Should your requirements change later, the basic machine design permits easy addition of the omitted features. This Besly engineering principle lets you get exactly the machine you need with the features you need—without costly waiting or redesign.

Economically grinds parts and materials like these:

parts	bearing races piston rings gear blanks	valve plates pump vanes clutch plates	or any part with two flat surfaces of nearly equal area which must be parallel to each other
materials	steel cast iron and their alloys	non-ferrous metals carbides	ceramics plastics

makes disc grinding virtually AUTOMATIC

spindle disc grinder



Besly's Famous "Sealed Quill Construction"

is built into this *all-new* grinder. Removed from the motor and other mechanisms for highly sensitive feed control, the spindle sleeves are cradled in the heads. They are moved by the feed screw, sliding on replaceable lubricated ways with clearance adjustment provided. Precise disc and head adjustment is constantly maintained for consistent grinding accuracy.

BESLY

For complete engineering details—write for Bulletin DH4

BESLY-WELLES CORPORATION

Est. as C. H. Besly & Co., 1875
188 DEARBORN AVENUE • SO. BELOIT, ILLINOIS
Telephone: So. Beloit, DUnkirk 9-2231

GRINDERS and ABRASIVES • TAPS • X-PRESS TAPS
DRILLS • REAMERS • END MILLS • TOOL BITS
GAGES • CARBIDE TIPPED TOOLS, BLANKS,
LAPPED TOSS-AWAY INSERTS and HOLDERS

Use postpaid card. Circle No. 222

Figure 1. Top view of the roll grinder shows contrast between a ground roll (left) and an unground roll.

"In Place" Roll Grinding

BY FRANK BUONOMO
Chief Design Engineer
B. S. Roy & Son Company

Roll maintenance, which involves significant costs for machine down time and spare roll inventories in addition to the actual expense for grinding, is a major factor in the maintenance budget of many companies. This case history describes one installation of an imaginative and ingenious device which could reduce such costs for many users of rolls.

● Unquestionably one of the most serious maintenance problems confronting those responsible for production is the redressing of cast iron, steel, rubber and husk rolls used in the production of paper, paints, inks, textiles and many other consumer products.

This roll maintenance problem becomes more acute as keener competition, in all fields, makes it necessary that "quality as well as quantity" be the byword of the end product. Top management has become increasingly aware of this and is continually looking for newer and better methods of roll maintenance.

Each year, millions of dollars worth of rolls prematurely find their way to the scrap pile, simply because roll redressing involves such a high cost in both labor and machine down time. This cost may vary from $100 to $1000 per roll, depending upon many factors such as type of mill or calender involved, length and weight of roll, surrounding obstructions which must be removed and distance from the O.E.M.

The machine down time, which is probably the most important element to be considered by those responsible for production, may range from one hour to four weeks, depending again upon governing factors.

With this down time hanging over a roll user's production schedule, rolls are often left in the production line until their condition does not permit further use, because they have become a detriment to the quality of the end product. This practice may reduce their possible useful life as much as 50%.

To clarify the problems encountered in roll maintenance, it will be best to cite an actual field case, reporting thoroughly and as accurately as possible, each roll redressing method employed therein—and the results obtained.

Company "A"—(One of the major producers of carbon paper, typewriter ribbons, etc.) has in its production line four horizontal mills, each containing three chilled cast iron rolls, 16 inches in diameter, 40 inches long (face width). The function of each mill is to crush the ink base prior to its use in the manufacture of the carbon paper and ribbons. The consistency of the ink produced from each mill must be the same and must be of high quality. This requires that each roll be as straight as possible, concentric, and possessing an excellent surface finish. Ink, being an abrasive, frequently contains hard particles of foreign matter which damage the roll surface during the crushing process. Actual wear on the roll circumference is a threat to the quality of the finished product. Pitting and scoring of hard particles would result in a high rejection rate of the ink produced. To eliminate this condition a periodic surface redressing of the rolls is required.

In the past, two methods of redressing were employed: first, removal and transportation to the O.E.M.; secondly, "Block Grinding" in the mill. In the first instance, the particular construction of the mill, made it necessary to remove the large and cumbersome independent drive gears . . . to remove the connecting and surrounding hot water feed pipes . . . and to remove the top frame section of the mill. Due to the location of these mills within the plant, professional riggers were employed to disassemble the rolls and ready them for shipment. This was extremely costly and time consuming. Total machine down time would amount to four or five weeks. As a result, returning these rolls to the O.E.M. has been virtually eliminated because the machine "down time" was difficult to fit into production schedules.

The second method employed, commonly known as "Block Grinding," consisted of forming both sides of a block of hardwood to the same contours of the mating rolls. This block of wood, with manufactured abrasive grain applied to one side, was inserted between the mating rolls . . . pressure then gradually applied as the rolls were rotated. This is a "trial and error" method, without accurate tolerance control. The manufactured abrasive grain will remove as much metal from the valleys as it will from the hills of the rolls. Although "Block Grinding" eliminated the removal of the rolls from the mill, it was both time consuming and costly—with no guarantee of the end results. In many cases, the time consumed to "Block Grind" one mill, with only fair results, would range from one to three weeks. This method did not remove the pit marks, nor did it correct roll runout.

To a small extent it did prolong the period when complete regrinding would become necessary. Again, because of the uncertainty of mill "down time," it was difficult to fit this method of roll maintenance into any production schedule, and was only employed when the high rejection rate of the ink produced warranted a mill shut down.

To alleviate these common problems has been a challenge which in-place portable grinding has been able to solve.

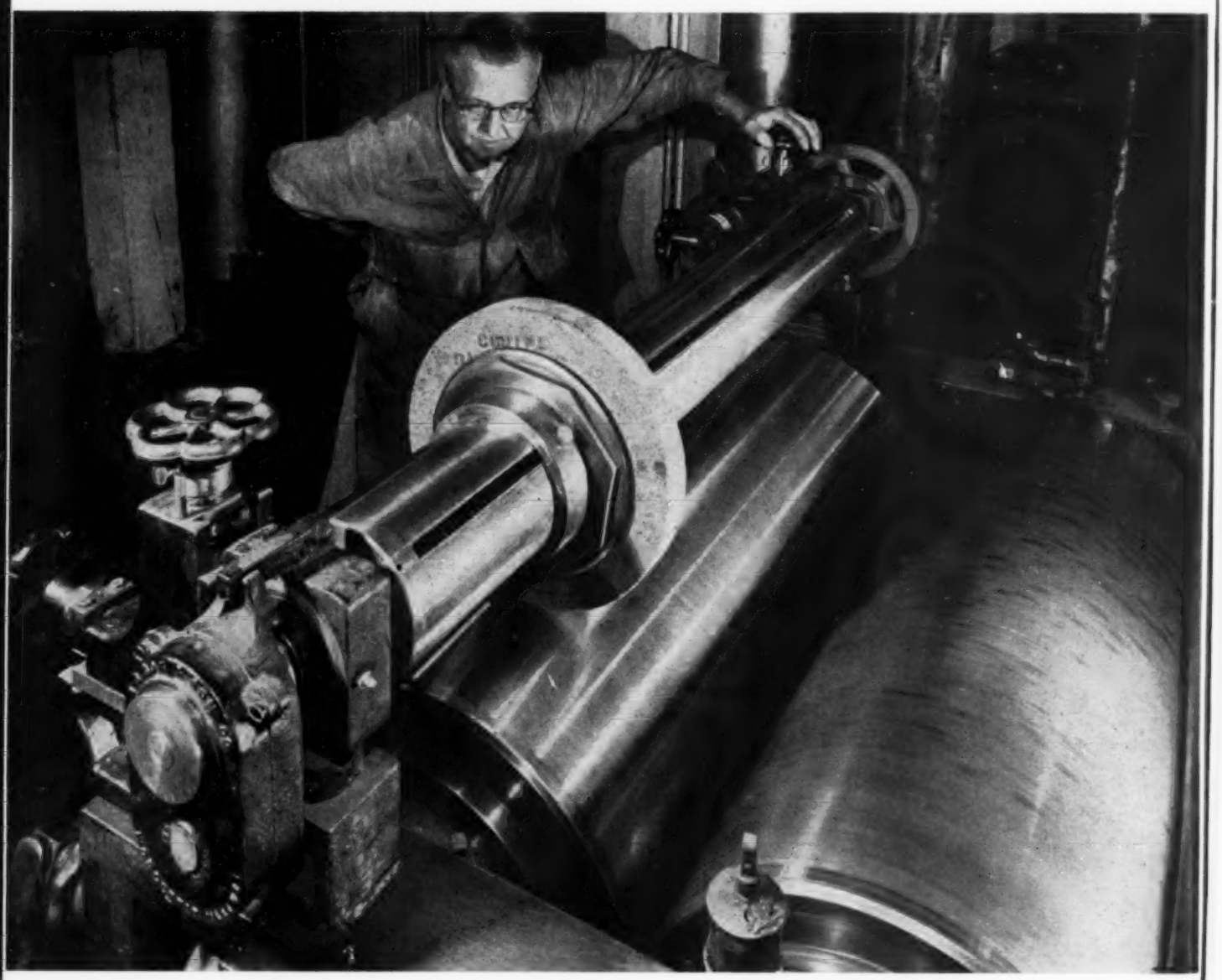
Commissioned to design and construct a suitable grinder, a B. S. Roy field engineer collected all pertinent data as to size of the mills, roll material, roll speeds, required finishes and tolerances, rigidity of the mill and rolls, and the possible mounting areas. A motorized Roy Portable Roll Grinder was constructed and designed to operate up to speeds of 1000 RPM. This particular grinder is equipped with a 12 inch diameter, self dressing emery wheel, engineered for chilled cast iron,—a geared housing to govern the wheel traverse across the face of the roll, dovetailed two way, (in and out, up and down), ball bearing micrometer feed stands, plus specially designed mounting brackets. The total weight, including the attached 1 horsepower drive motor, was 380 lbs.

The "initial" installation of the grinder and special brackets required approximately one and a half hours for each roll, and did not require overhead rigging, or the removal of any surrounding equipment or connecting pipes.

The first roll ground (Fig. 1) being the most critical of all three, had to be ground to within a straightness and roundness tolerance of .0005 of an inch, and a surface finish of 16 to 32 micro inches. This roll was out of round and had two, one-half-inch wide grooves, .012 of an inch deep, worn into the surface, near its outer edges. It required, therefore, the removal of approximately .026 of an inch of metal to return it to its full usefulness. To remove these grooves and obtain the specified roundness, straightness, and finish tolerances, require approximately 6 hours operating the grinder at 2400 SFM with a wheel traverse of 34 2 inches per minute across the face of the roll. Initial "rough" grinding was accomplished with a Norton "Crystolon" wheel, coded 37C24PVK. The high finish, desired as a final result, was ground with Norton's "Alundum" wheel, 32A36M7VG.

The second or middle roll was out of round plus pitted by the hard particle found in the ink base. Due to the depth of these pit marks approximately

Figure 2. A still view of the roll grinder, showing the outer shell on which the grinding wheel is mounted, and the reversing worm gear inside which traverses the wheel back and forth across the circumference of the roll.



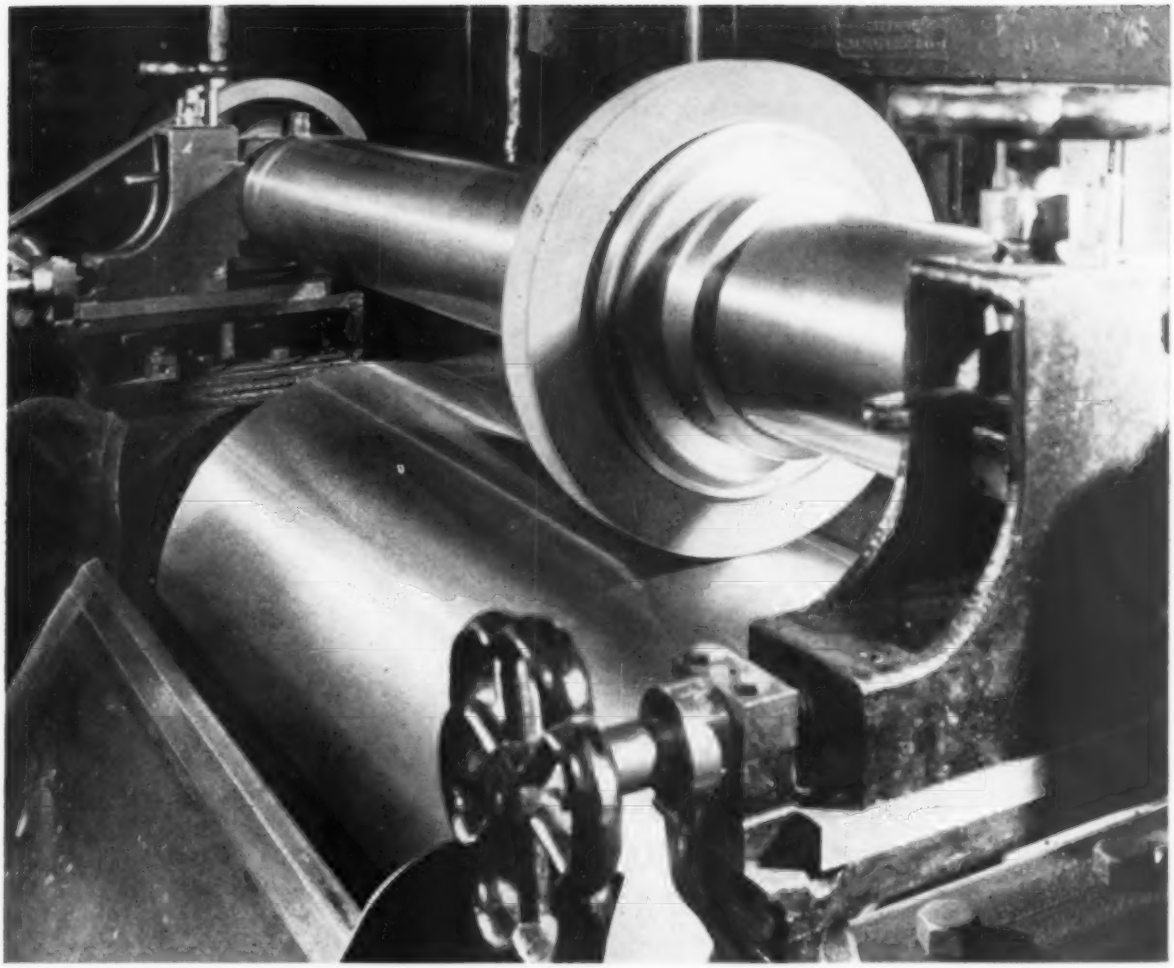


Figure 3. A Roy "In Place" roll grinder in operation on a chilled cast iron roll 16" in diameter and 40" long. Each unit is custom-built for the mill on which it is used.

.010 of an inch of metal had to be removed from the diameter of the roll. Although the tolerances and surface finish were not as critical as on the first roll, it never the less, was held to the same quality of grind. Approximately four hours were required to bring this roll back to its original usefulness. The third or "feeder" roll, not critical to the process, was not ground at this time.

It should be noted that a coolant problem did not prevail, since an engineered "dry grinding" method was employed. A designed drive unit based on a weight control factor, makes it impossible to burn the roll surface. The grinder's proven operational simplicity made it possible for the company's maintenance men to become proficient grinder hands, after the first application. The first trial run of ink processed after redressing passed every prescribed detailed test established by the Quality Control Department.

This is particularly impressive where it is realized that this mill had been removed from production as a result of roll condition. There had been some discussion about not refurbishing the unit at all . . . due to the high cost of returning components to the O.E.M.

A few of the many benefits that may be derived from the continual use of the Portable Roll Grinder in our overall production program are as follows:

- Companies will now be able to schedule and carry on a "planned periodic roll maintenance program."
- Mill "down time" will be reduced drastically . . . often from as much as 4 weeks to three days or less. . .
- Labor cost will be substantially reduced.
- Rolls "useful-life" will be proportionately increased.
- Any roll, accidentally damaged, may be put in "first class" condition immediately.
- Space roll inventory may be held to minimum, since there will be fewer occasions when rolls will need to be returned to the O.E.M.

The unit cost of a Portable Roll Grinder can be completely amortized after two or three applications.

There are countless uses in the broad field of roll redressing for the Roy Portable Roll Grinder. Successful applications include "in-place" rubber rolls (latex to hard), cotton and husk rolls, and steel rolls. The sizes of the rolls ground have ranged from 16 inches to 60 inches in diameter and in lengths up to 100". In each case the grinder was designed and engineered to grind specific tolerances and finishes.

Frequently, manufacturers like to remove rolls from equipment in order to check bearings. It has been successfully demonstrated, particularly with rubber and husk covered rolls that it is practical to redress these rolls while they are out of the machine but still in the manufacturers plant, using the Roy Portable Roll Grinder as a rigid floor unit.

It would be presumptuous to leave the impression that the Roy Portable Rool Grinder is a "cure-all" for every roll maintenance problem. It is, however, the first major step taken by any company to combat this universal problem. • • •

Figure 1. Wheel with built-in guard, showing in addition the guard before it is molded on the wheel. The threaded bushing for mounting the wheel on the grinder is integral with the guard.

An objective report of a series of tests comparing cup wheels containing a one-piece prong bushing and safety back, molded in, against conventional cup wheels reinforced with either a prong bushing or a bushing and a steel ring.

The Case for "Built-In Guard" Cup Wheels

By HOWARD R. KERBER
Assistant Product Manager
Bonded Abrasives Division
The Carborundum Company

● The introduction of portable cup wheels with a one-piece combination cup guard and prong type bushing molded into the back of the wheel has been one of the more outstanding recent developments in abrasives. Such a wheel has several obvious advantages over conventional cup wheels used with a cup guard placed over the back of the wheel when it is mounted on the grinder.

One such benefit is that the safety guard is always attached to the wheel. There is no chance for it to be mislaid or forgotten. Another is that there is less interference with the work, since the guard is flush with the abrasive, rather than extending over it, as with conventional rotary safety guards. As the wheel approaches stub size, it can be used in corners that would otherwise be inaccessible.

In an attempt to determine the merits of the new wheels in comparison with conventional cup wheels, The Carborundum Company recently completed a series of tests designed to probe such matters as the ultimate bursting speed of the wheels and the ability of the guard to retain pieces of a damaged wheel. All of the wheels included in the test were 6/4-3/4 x 2 x 5/8-11 resinoid cup wheels, identical as to grading, and of medium strength and hardness. One group (Figure 1) were molded with one-piece built-in guards, essentially a combination of a prong type bushing nut and a rotary cup guard. A second group (Figure 2)

Figure 2. Similar wheel, showing in the foreground the hex nut and the reinforcing ring which are molded into the wheel.

Figure 3. Wheel with rotary guard in place. In the foreground is the prong type bushing that is molded into the wheel.

had a hex nut with a 3" reinforcing ring around it, molded into each wheel. The third group (Figure 3) were equipped with prong type bushing nuts. In the test, wheels of the first group were used without additional protection, while wheels of the other two groups were mounted with conventional rotary guards.

In one series of tests, wheels of each type were run to destruction in a speed testing unit. Running free, there was no significant difference in the ultimate bursting speed of wheels of the first two groups, but wheels with the built-in guard cup back consistently withstood speeds ten per cent or more higher.

In another test, wheels from each of the three lots were cracked across the diameter in a controlled manner. This was accomplished by placing a piece of piano wire under the backs and pressing in a hydraulic press to a point where the wheels cracked, but did not separate to any appreciable extent. Then the cracked wheels were mounted and run to destruction in a speeder unit. As before, the wheels molded with prong bushings or hex nuts were mounted with rotary guards, while the safety back wheels were run without added protection.

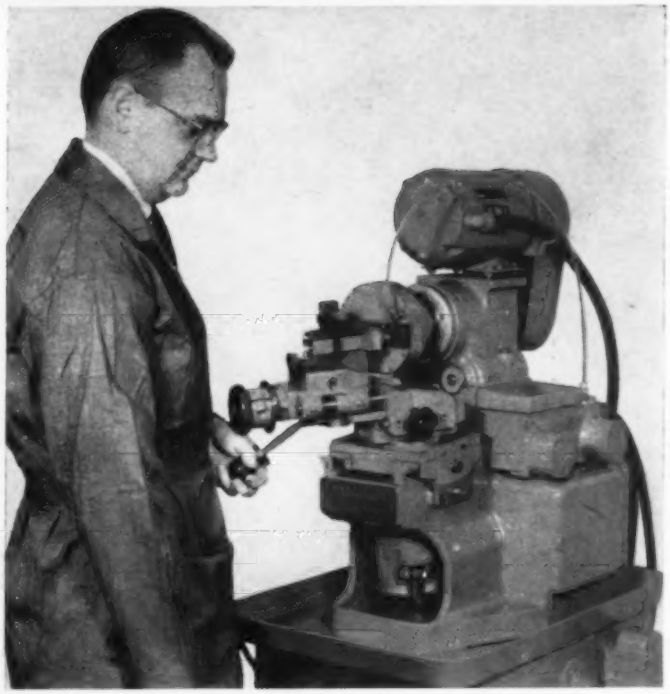
All of the wheels withstood an ultimate speed somewhat above the recommended maximum operating speed of 9500 sfpm for the wheels under test. Here again the built-in guard wheels were superior, achieving an ultimate speed of approximately 20% above 9500 sfpm. The percentage of ultimate speeds of the other two groups of wheels over 9500 sfpm, were about 17% for the pronged bushing wheels, and 6% for the hex nut wheels.

To determine if any weakness existed in a plane at the top of the built-in guard and wheel, an impact test was devised. Wheels were fastened on the end of a six-foot long pendulum arm by means of a threaded projection similar to the threaded spindle on a grinding machine. These assembled wheels were then allowed to swing from various heights and strike a heavy steel block at the bottom of the swing. Depending on the height of drop, pieces chipped from walls of all the wheels dropped to approximately the same degree. When the impact was increased to the extent that the wheels fractured through the back, wheels with the built-in guard did not shear off at the junction of the wheel and the guard. The abrasive broke out in a random pattern both above and below the top of the guard.

A cracked wheel should never be used, even though these test results indicate that all of the cracked wheels held together at recommended maximum operating speed when running free. During these tests, however, as in any speed test, the major stress on the wheels resulted from centrifugal force. In use, there are other stresses which affect the wheel, and for that reason, the tests cannot be interpreted to signify that a cracked wheel of this type can be operated safely at or above the recommended maximum speed. **Any wheel which has been dropped or severely bumped should be discarded without further use.** The ability of the guard to retain pieces of a cracked wheel, however, should provide sufficient time to shut off a grinder in case a wheel is accidentally dropped or subjected to any other severe impact that may have damaged it.

Because the weight of a wheel used on a portable grinder is an important factor in operator fatigue, it was felt that this factor should also be checked. Wheels with built-in guards proved to be about 10% lighter than the other two-types of wheels. The actual weights were as follows: built-in guard wheels—4.15 lbs.; wheels with pronged bushing and rotary guard—4.53 lbs.; and wheels with hex nut, reinforcing ring and rotary guard—4.56 lbs. • • •

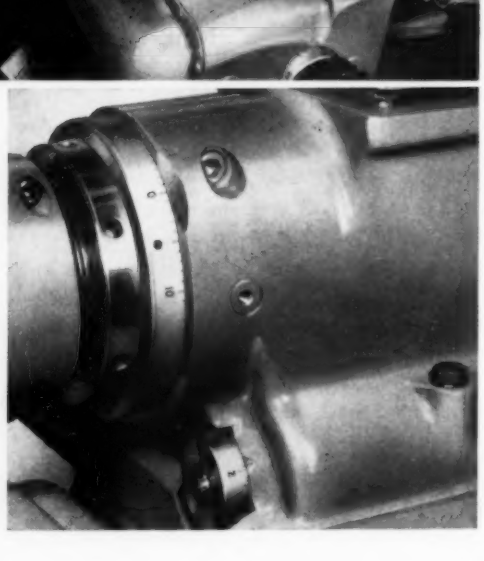
Accuracy, repeatability, set-up, blending of radius, these are the problems solved by a unique new type tool grinder. This machine provides a grinding set-up never before provided in a machine.



The Micropoint Tool Grinder.

Tool Geometry Grinding Solved

● What are the problems involved in grinding single point tool profiles? Accuracy, repeatability, set-up, blending of the radius, one or all of these confronts every tool grinder. All these problems now depend upon the operator's skill and ingenuity to combat. DeVlieg Machine Company, Fair Street, Royal Oak, Michigan, a precision boring machine and tool manufacturer, has for a long time been faced by these problems. It is not surprising, therefore, that they should develop a grinding machine to solve these problems with simplicity and accuracy. The first Micropoint Tool Grinders built by DeVlieg have been in use for their own manufacturing about a year.



Above: Aligning the wheel to the master setting rod.

Right: Adjustable collar on spindle for setting the radius.

The Micropoint Tool Grinder is designed to grind single point tools of carbide, H.S.S. and ceramic up to 1" square or round. The most distinct advantage is set-up. In fact, the Micropoint actually fills a void in so far as set-up is concerned. Until now, set-up for grinding single point tools required special fixtures for each tool. Even with fixtures, repeatability is a problem. Set-up of the Micropoint is merely a matter of direct dial settings; the dial settings assuring repeatability to precise tool geometry requirements.

To further emphasize the ease of set-up on this grinder, the procedure is as follows: align the wheel face to the master setting rod on the side of the spindle, adjust the collar of the spindle for the desired radius, set one of the two protractors for the relief angle, set the stops for the cutting angles, set knobs for left or right offset and place tool in the "V" block so that it is in contact with the wheel face. All that is left to complete the operation is to feed the tool into the wheel while swinging the tool between the stops for the angles until the finish is reached.

Consisting of a mechanically traversing wheel head, a work holding assembly and a base, the grinder is capable of grinding all the surfaces of single point tools. All surfaces are ground from one set-up except for rake angles which are ground by rotating the tool 90° and setting the stop for the desired angle.

The wheel head is traversed or oscillated by an eccentric control. This oscillation can be adjusted to keep the tool point within approximately .050" of each edge of the wheel. Proper radius control is maintained by keeping the tool point in contact with the wheel during the grinding operation.

Traverse or oscillation is adjusted by a dial on the back of the machine for stroke lengths from 3/16" to 1½". The entire wheel head assembly can be reposi-

tioned so that grinding can be performed on either side of the wheel. Spindle rotation is also reversible so that the tool is always sharpened with the wheel rotating downward. These features provide the flexibility for grinding left or right-hand tools and for facing the tools.

The accuracy, geometry and repeatability of this machine is obtained for the most part by a very unique work holding assembly. This assembly consists of two sets of arc shaped ways which are calibrated by protractor ranging from 5° on one side of zero to 15° on the other. These two protractors provide the accurate settings needed to obtain either cylindrical or conical relief angles. The cutting edge angles are set on still another protractor located at the bottom of the work holding assembly. This protractor is provided with two stops; each stop being set for one of the cutting angles. The stops are constructed with springs to cushion the end of the stroke for each cutting angle. In setting the stops, an offset mark is used to prevent any error which could occur if the spring had to be depressed during setting. Graduations are in increments of one minute of arc.

Offset alignment of the tool is accomplished by right and left hand adjusting knobs on the work holding assembly. The right hand knob adjusts for right hand offset and the left for left hand offset. The dials are graduated in increments of .0005" with total offset adjustment of ½".

Radius settings are obtained by adjusting the relationship of the wheel face to the center line of rotation in the work holding assembly. The wheel face is first located from a master setting rod which is positioned in assembly and thus provides a permanent reference point. After adjustment of the wheel face the radius can be set on the graduated dial on the front locking collar of the spindle. The dial is graduated in increments of .0005". Maximum radius is ⅞".

Built-in accuracy is obtained by the close tolerance manufacturing. Design features which provide high accuracy are: the fine increments on the dials and protractors, angular bearings to take the thrust on the wheel face, nylon belts to reduce vibrations, motor balanced to .0002 dynamic balance, two guide bars with preloaded ball bushings for the wheel head oscillation, two preloaded bearings on a two to one ratio on the work holding assembly with the top bearing angular and shielded, dove tail ways and spring loaded double nut on the lead screw cross feed.

DeVlieg formerly used lapping machines to grind all their tools. Special fixtures were used for each grind and accuracy of each tool had to be checked. Setting often took as long as 45 minutes. They are now able to set up in 5 minutes and check only the first tool from a setting.

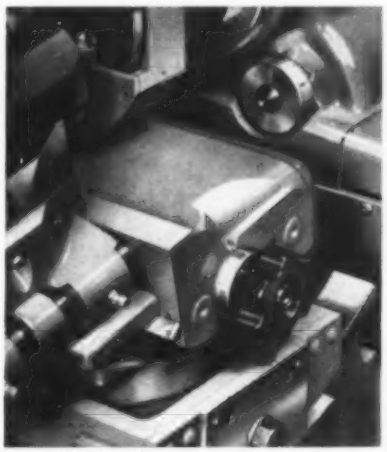
Wheel life has been increased 5 to 6 times over their previous method. There are two reasons for this increase: Power operation of the wheel oscillation and cushioning of the stops for the angle grinding. DeVlieg has found the use of the grinder and use of cone ground radius relief has increased tool life 15 to 20% and even up to 50% in some cases. The cone relief provides a constant mass of tool behind every point on the cutting edge.

One of the many users of the Micropoint tool grinder is The Goss Printing Press Company in Chicago, builders of newspaper and magazine printing presses, and other equipment for the Graphic Arts industry.

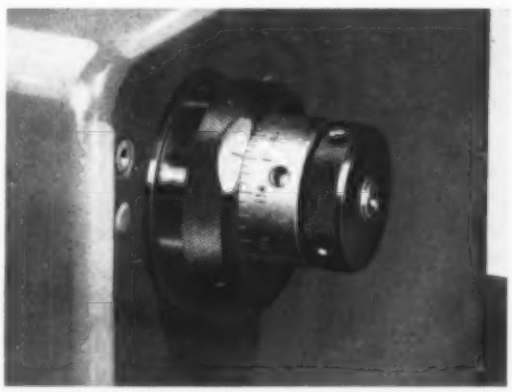
Goss, a large user of DeVlieg Precision Boring Machines for processing the many parts on printing presses requiring accurate dimensioned and good finished holes, recognized immediately the advantage over other grinding methods for grinding microboring tools, as well as other single point tooling.

Standardizing the various tool grinds, they find the repeatability for the various tool geometry accurate and reliable, and is accomplished by merely setting dials and protractors to previous established standards.

• • •

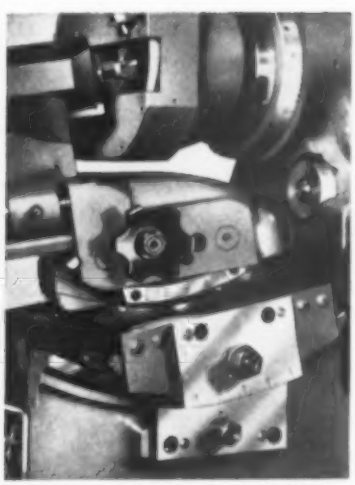


Right hand adjusting knob for setting the offset.

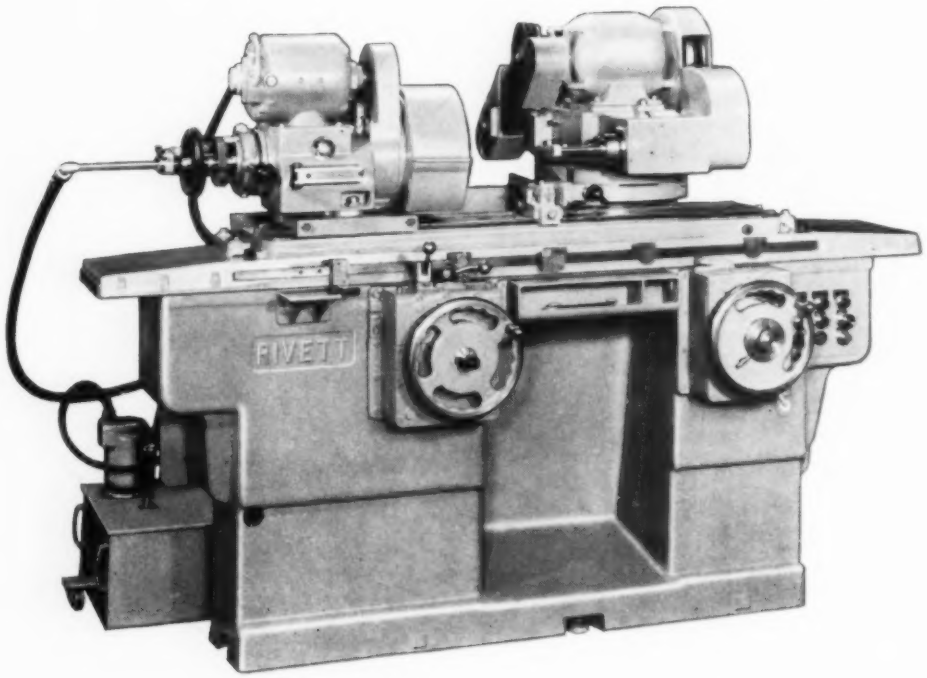


Dial on the rear of the machine for setting the occilation or traverse of the wheel head.

Protractor at bottom of work holding assembly for setting the two cutting edge angles.



Two arc shaped protractors provide settings for either cylindrical or conical shaped relief angles.



GRINDS INTERNALLY AND EXTERNALLY EQUALLY WELL?

SURE! THAT'S WHY OUR RIVETT IS THE MONEY-MAKING-EST GRINDER IN THE SHOP!

Rivett 1024 Internal and Universal Grinder

You can keep this grinder always busy! Do any number of internal jobs and then switch over to external work. It has all the features of a true internal grinder — extra-long table moves sufficiently to left to permit plug gauging to 6″ depth without retracting wheelhead slide. External wheelhead is not hinged, but swivels a full 180° for quick conversion! Grinds any hole to 9″ diameter and externally to 12″ diameter.

No need for two special machines when you have a 1024! — particularly where grinding jobs are varied and production on any one run is limited!

RIVETT LATHE & GRINDER, INC.
Department GF 3 Brighton 35, Boston, Mass.

Get *all* the facts in Bulletin 1024B. Write for your copy today!

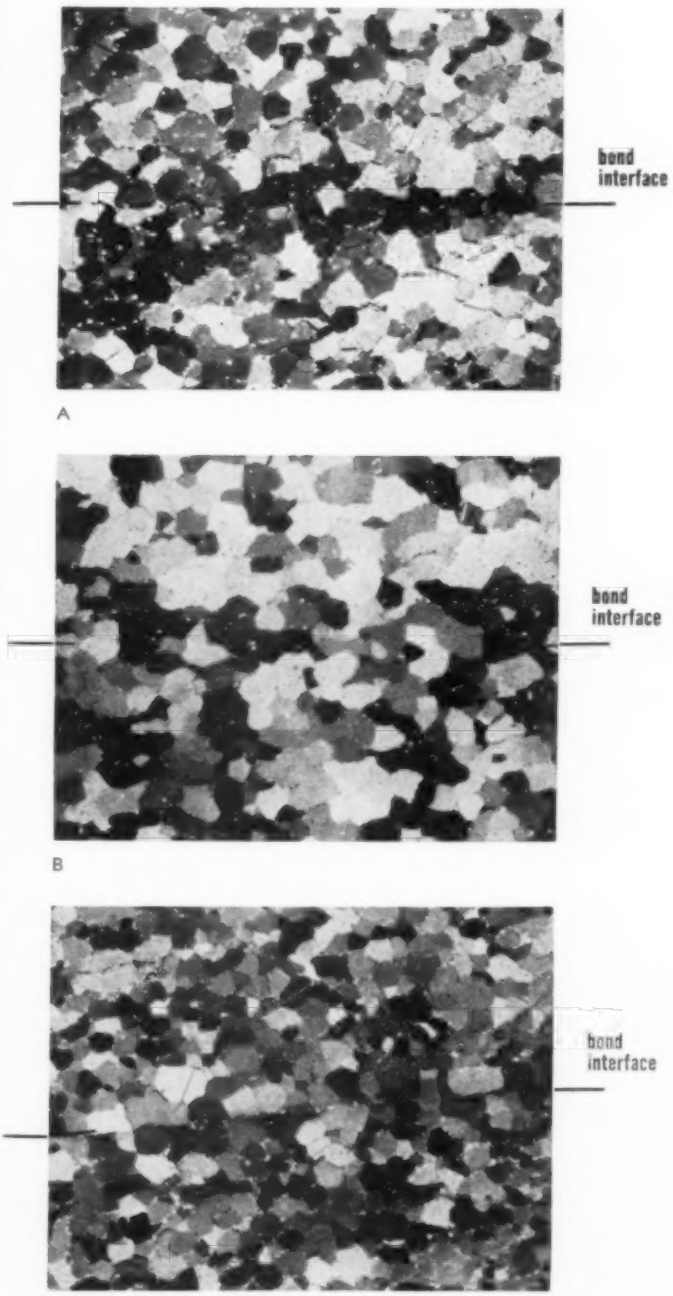
RIVETT
INTERNAL & UNIVERSAL GRINDERS

Use postpaid card. Circle No. 225

Surfacing Zirconium Alloy Sheets with Abrasive Belts

Gas-pressure bonding requires an uncontaminated flat surface. Much of the success of the bonding process depends upon the surface quality before bonding.

By HUGH N. DYER and R. A. LEGGETT
Product Engineering Dept.
Behr-Manning Co.



A

B

C

● In the assembly of zirconium-clad elements for atomic reactors, a method of preparation for the surface of the zirconium sheet was sought which would leave an uncontaminated flat surface in order that the sheets would form satisfactory bonds to one another by the gas-pressure bonding process.

In this bonding process, the reactor grade Zircaloy 2 sheets are surface finished, degreased, detergent washed, rinsed, and assembled into a protective container which is evacuated and sealed. The sealed assembly is then subjected to helium pressure at an elevated temperature in a high-pressure autoclave. The high pressure brings the mating surfaces into intimate contact and bonding is effected by diffusion and grain growth across the interface. Since this bonding process involves only slight deformation as compared with roll cladding or extrusion cladding, the method used to prepare the Zircaloy surface has a significant influence on bond quality. It has been found (see S. J. Paprocki, E. S. Hodge and C. B. Boyer, **Preparation of Reactor Components by a Gas-Pressure Bonding Technique,** Proceedings of the Second International Conference on Peacetime Uses of Atomic Energy, Geneva, Switzerland, September 1-13, 1958) that pickled Zircaloy surfaces are slightly contaminated and do not bond satisfactorily in the alpha-phase region, that grit-blasted surfaces contain embedded grit and give contaminated and weak bonds, that grain growth does not occur across the bond between cold-rolled surfaces, even with clean surfaces, and that machined or abraded surfaces of annealed Zircaloy bond perfectly. Good bonds are obtained by any process that produces a uniform roughness above approximately 80 micro-inches RMS, provided the surface is uncontaminated by embedded abrasive grit or other material, and that the surface finish is readily reproducible. These conditions can be met most

A Typical bond between cold-rolled and belt-abraded Zircaloy components. Belt speed 2,000 ft. per min. sulfonated oil coolant, grit 60 silicon carbide abrasive.

B Typical bond between hot-rolled and belt-abraded Zircaloy components. Same conditions as A except 2,700 ft. per min. belt speed.

C Typical bond between vapor-blasted and pickled Zircaloy components.

(continued)

economically by coated abrasive belt grinding if careful standardization and control of the abrading process are maintained.

The specimens in this study were composed of small plates of Zircaloy 2 of reactor grade that had been belt abraded under varying conditions. The variables investigated were abrasive belt speed, type of grinding fluid, type and size of abrasive grain, and total amount of metal removed. Both hot- and cold-rolled Zircaloy were used in the study. Pressure bonding was performed at 1550F for five hours at 10,000 psi. The bonds were evaluated metallographically to determine the amount of bond-line contamination and the extent of grain growth across the original bond interface. They were also peel tested by driving a chisel into a V-notch at the bond interface, and corrosion tested in steam at 750F.

The samples were abraded on an abrasive belt surface grinder using an X-serrated, 80 durometer rubber contact roll. The abrasive belt speed was varied from 1100 to 5500 ft per min and the two grinding fluids investigated were a heavy sulphur-chlorinated cutting oil and tap water. The Zircaloy was fed through the grinder at 4 ft per min and the mount of metal removed was 0.001 in. to 0.005 in. per side. The stock removal was in the order of 0.0005 in. to 0.001 in. per pass through the machine and belts coated with both aluminum oxide and silicon carbide were used.

Table I summarizes the results of the study. Good bonds, as evidenced by absence of bond-line contamination and complete grain growth across the bond interface were obtained in both hot- and cold-rolled Zircaloy with properly prepared surfaces. These bonds could not be separated in the peel test and showed no attack during corrosion testing. The best combination of abrading conditions appears to be grit 60 silicon carbide abrasive belts, run at 1500 to 3000 ft per min, with sulphur-chlorinated oil grinding fluid. The total amount of metal removal did not appear to be critical except, of course, that a clean, new surface had to be exposed by the operation.

Figures 1 and 2 illustrate the good bonds obtained with properly abraded surfaces of both hot-rolled and cold-rolled Zircaloy. Figure 3, by comparison, shows a poor bond obtained with vapor-blasted and pickled Zircaloy surfaces.

On the basis of these results, machine abrasive belt finishing appears to be a satisfactory technique for preparing Zircaloy surfaces to obtain good metal-to-metal bonds by the gas-pressure process. Careful standardization and control of the abrading process are necessary if bonds of good quality are to be obtained consistently and economically.

In the grinding of Zircaloy, an extremely hot, intense spark is produced and certain precautions are necessary in order to prevent fires when grinding with an oil base grinding fluid. Low belt speed helps to reduce the intensity of the spark, and a heavy flood of oil directed at the grinding point quenches the spark rapidly. An oil having a high flash point (above 350F) is required, and it is necessary to use an efficient filter to remove suspended chips from the recirculated oil. • • •

(The authors are indebted to Mr. D. C. Carmichael of Battelle Memorial Institute, Columbus, Ohio, for evaluating the samples of Table I and for the photographs of Figures 1, 2, and 3.)

TABLE I

EVALUATION OF PRESSURE-BONDED SPECIMENS PREPARED WITH MACHINE BELT-ABRADED ZIRCALOY SURFACES

Specimens Bonded at 1550F and 10,000 psi for 5 hr.

Material	Metal Removal, in. per side	Abrasive	Grit	Speed, ft per min	Coolant	Amount of Grain Growth, per cent	Extent of Contamination	Results of V-notch Peel Test	Results of Corrosion Test (1 week in 750F steam)
Hot rolled	0.003	SiC	60	5500	Water	85	Light	Good	No attack
	0.002	SiC	60	5500	Water	95	Very Little	Good	No attack
	0.003	SiC	180	5500	Water	85	Light	Good	No attack
	0.005	SiC	60	2700	Sulfonated Oil	100	None	Good	No attack
	0.001	SiC	60	1100	Sulfonated Oil	90	None	Good	No attack
	0.003	SiC	60	1100	Sulfonated Oil	90	None	Good	No attack
	0.005	SiC	60	2700	Sulfonated Oil	100	None	Good	No attack
	0.003	Al_2O_3	60	5500	Water	20	Heavy	Good	Slight attack
Cold rolled (3:1)	0.001	SiC	180	5500	Water	35	Intermittent	Good	No attack
	0.002	SiC	180	5500	Water	30	Intermittent	Good	No attack
	0.003	SiC	60	2000	Sulfonated Oil	95	None	Good	No attack
	0.003	SiC	60	2000	Sulfonated Oil	95	None	Good	No attack
	0.005	SiC	60	2000	Sulfonated Oil	95	None	Good	No attack

Here's How Wet Blasting Cleans Forging Dies

By wet blasting with a properly selected abrasive, dies are cleaned in 10% or less of previous time and require little or no hand touch-up work. Other benefits result from increases in die life ranging up to 43% and from reductions in production downtime.

By L. D. STEVENS
Process Engineer
Techline Division
Wheelabrator Corporation

● Any foreman in the die room of a forge shop is familiar with the problems associated with cleaning dies after use or during prolonged production runs. Unfortunately, most forging dies are worn out on the grinding bench rather than on the drop hammer where they are used for productive purposes.

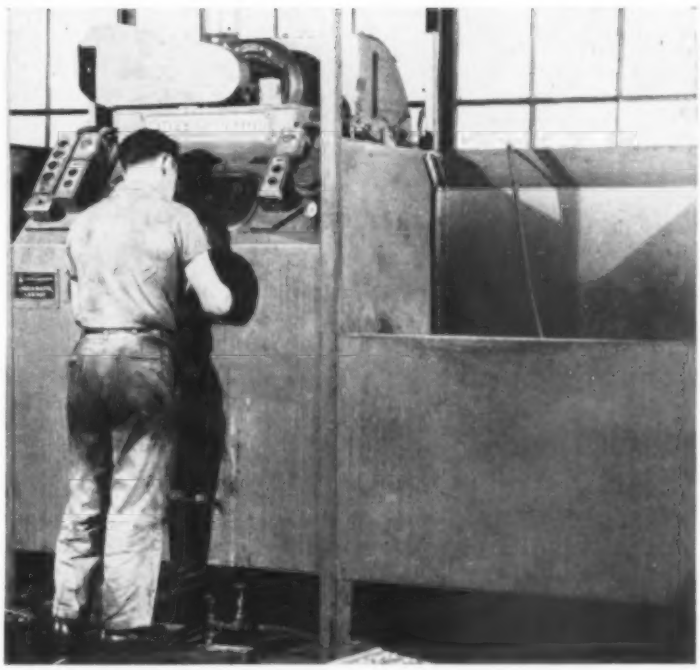
Like everyone else, forging shops are always interested in a better, faster, and a cheaper method of doing things. Here is an account of the solution to the eternal problem of cleaning forging dies. This material was submitted to us by one of our customers, a prominent forging plant specializing in automotive forgings. This shop has been using the wet blast method of die cleaning for over two years.

This particular company had been cleaning their forging dies on the usual grinding benches. Grinding is an effective way to clean, but it is time-consuming and must be done manually. It is impossible for the most skilled die room personnel to grind forging dies without abrading some steel from the dies themselves.

Direct labor costs are high when hand-grinding dies. The more intricate the shape, the more difficult they are to clean. The men who do the grinding are skilled labor, and must be paid accordingly.

As an example, the plant referred to uses a number of dies ranging in length and width from 8" x 9" to 18" x 18". The thicknesses vary from 1½" to 12" on these dies and the weights range from 30 to 1000 lbs. The grinding operation normally required from 1 hr. to 4 hrs. cleaning time on each die.

The executives of this firm were quite impressed with reports they had heard on cleaning other types of dies and molds by the wet blast method. They found it had also been successfully adopted by several other forging companies for cleaning dies. They became convinced that wet blasting would be a partial solution to their problems and purchased a Model 43 Liquamatte manufactured by the Techline Division of Wheelabrator Corporation.



One operator cleans all dies used during the preceding day and night shifts. In from five to fifteen minutes, the Liquamatte cleans dies that formerly required up to four hours cleaning time.

Interior of wet blast finishing machine showing how the operator guides the abrasive slurry upon the die to be cleaned. The rotating table mounted on the work car enables the operator to turn the piece for thorough coverage of all areas.

They have reported some very interesting tangible as well as intangible results from the installation of this wet blast cabinet.

Maintenance records show actual increased die life ranging up to 43%. This single factor is important

enough to warrant investigation of the wet blast cleaning process.

How is this increased die life possible?

This requires a combination of a good wet blast cleaning machine and the use of the proper abrasive. This particular company is using a Liquasheen Abrasive supplied by Techline. The abrasive particles consist of a hard synthetic crystalline substance suspended in a slurry of water. Liquasheen is actually a type of glass bead specially manufactured to resist fracture upon impact.

The slurry consists of equal parts of abrasive particles and water by weight. The particle size of this abrasive ranges from 44 to 74 microns in size.

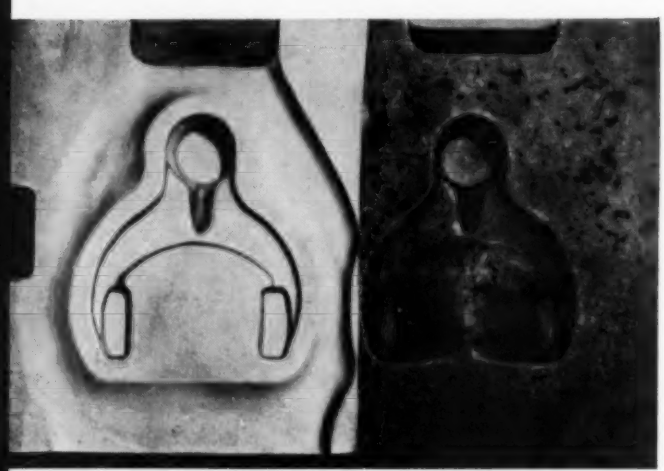
A good abrasive for cleaning forging dies is required to be a "good cleaner" but a "poor cutter." This sounds like a contradiction in terms but it is easily understood after a brief explanation. The abrasive particles must be harder than the scale they must remove, to cut it away readily. At the same time the special die steel is hard enough to resist the abrading action and it tends to wear the abrasive particles down rather than fracture them. The result is a good cleaning action with a minimum of metal removal.

If wet blasting could offer no other advantage than the greatly reduced cleaning time already proven in the die room at this forging company, it would still be a very economical operation. This firm reports time savings of up to three hours and 45 minutes on a single die. All their dies are now cleaned in from five to 15 minutes as compared to times ranging from one hour at a minimum up to four hours.

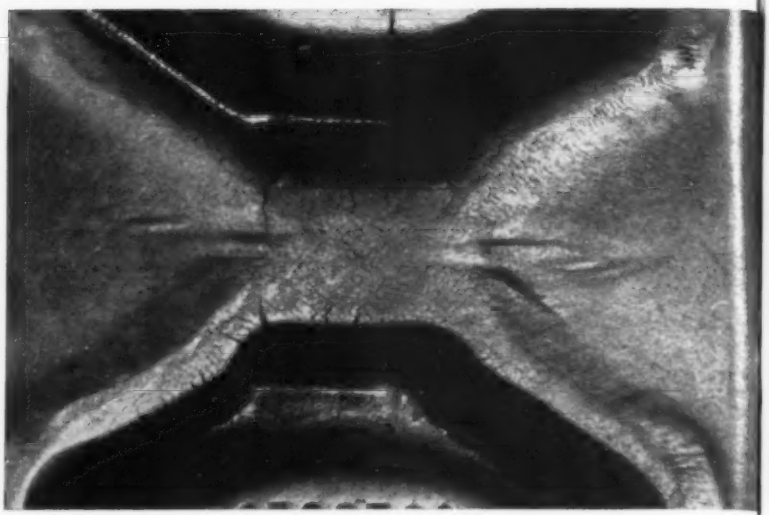
The only hand touch-up work now required is to remove occasional "hooks" in the die that develop during production runs on the drop hammer.

It takes a very short time to train a man to operate a Liquamatte cabinet. The slurry from the nozzle can easily be directed into any crevice or recessed area of the die, allowing uniform cleaning action on all surfaces of any complex design.

Another factor that adds to the ease of wet blasting the die is the work table in this machine. The die is rested on a small round table and the operator can easily turn the table with one hand. In this manner there is no guesswork needed; he can rotate the table and the die to be sure that the nozzle is directed into all crevices and difficult areas to clean.



This forging die was masked and the left half of the die was completely cleaned as illustrated in ten minutes. The smooth non-directional finish makes die inspection much easier and prevents forgings from sticking when the die is in use at the drop hammer.



Close-up part of cleaned forging die, illustrating the exposure of fatigue cracks that might otherwise go undetected. This enables a forge shop to make minor repairs and forestall major die repairs of premature die failure.

When any die is being used on a long production run, it is necessary to remove it periodically for cleaning. The Liquamatte does this job in as little as one-sixteenth the former time. This greatly reduces the downtime on a drop hammer and makes it possible to achieve maximum operating efficiencies of the drop hammers and the men operating them. This is a particularly important factor in those forging shops where production runs are the rule rather than the exception.

This forging company knows dollar for dollar how much money they have been able to save with their Liquamatte. The savings from increased die life, reduced labor costs and downtime completely paid for this machine during its first twelve months of operation. This does not include the production savings they have achieved during the past year as the machine is now over two years old. However, there are other intangible benefits.

The most outstanding "intangible" benefit is the ease and speed of die inspection that is now possible. The uniformly cleaned die surface is free from grinding lines, enabling the men in the die room to detect readily any slight defects or fatigue cracks. Now defects can be repaired before more extensive damage or premature die replacement becomes necessary.

Another point is the reduced tendency of the forgings to stick in the dies at the drop hammers. This firm reports a considerable reduction in the use of swabbing oil during production runs, and they attribute it to the non-directional finish imparted to their dies in the Liquamatte cabinet.

This machine has proven practically maintenance-free. Periodic inspections and occasional changing of the Liquasheen and water slurry has been the major extent of all maintenance expenditures on this particular wet blast cabinet.

The reliable cost records of this company indicate that forging dies no longer have to be worn out on the grinding bench. The labor savings, reduced downtime, ease of die inspection, and low operating costs, make it appear certain that hand grinding is no longer an economical method for cleaning forging dies.

•••

Ideas from the Shop

Thermometer mounted on bearing cap with modeling clay aids in making uniform adjustment.

Thermometer Helps Adjust Grinder Bearing

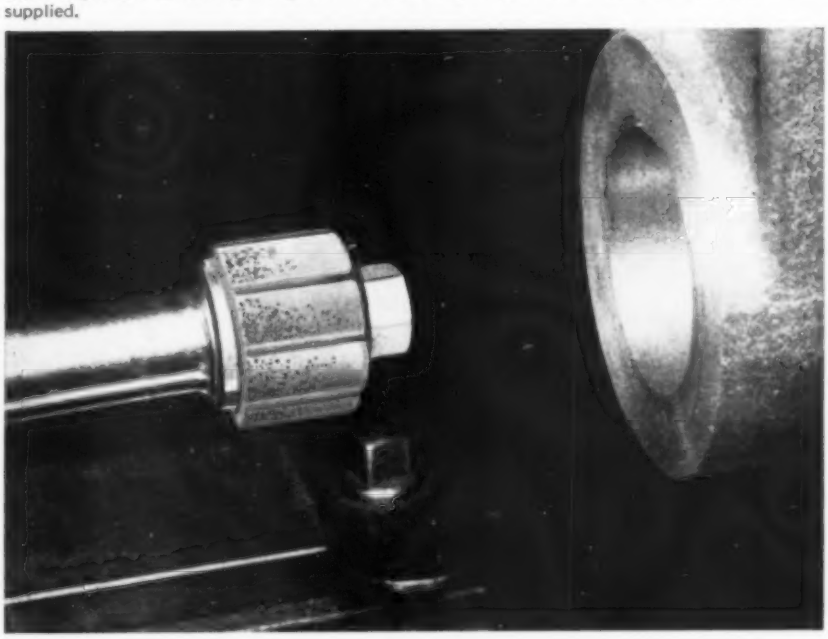
By H. J. GERBER

● We have in the past had considerable difficulty in making proper and uniform adjustment of the adjustable bronze spindle bearings on our universal cylindrical grinder.

The solution to the problem was simple. We attached a sensitive thermometer to each bearing cap with a chunk of modeling clay, as shown. The bulb of the thermometer is placed in close contact with the bearing cap.

The machine is allowed to run about 15 minutes before thermometer readings are taken. After noting any difference in temperatures one or the other of the two bearings is tightened. After continued running for another ten minutes readings are noted again. Balanced temperatures seem to indicate uniform adjustments as the performance of the machine invariably improves.

Axial slots around the peripheral face of an internal face of an internal grinding wheel improve free cutting and prevent overheating on jobs where coolant cannot be supplied.



Internal Grinding Wheel Slotted for Cooler Cutting

By H. J. GERBER

● Often when an internal grinding wheel of proper grade is not at hand, the hardness characteristics of the available wheel can be altered by a series of axial slots spaced around the peripheral face of the wheel. These slots can be quickly laid out for approximately equal spacing and cut in freehand with an old hacksaw blade. This improvisation has many times improved the free cutting characteristics and eliminated over-heating on jobs where it was not possible to supply a coolant.

It is possible that the increase in efficiency results from a combination of two factors: The "fan" action of the slots create a cooling effect and the interruption of the continuous wheel surface promotes bond breakdown.

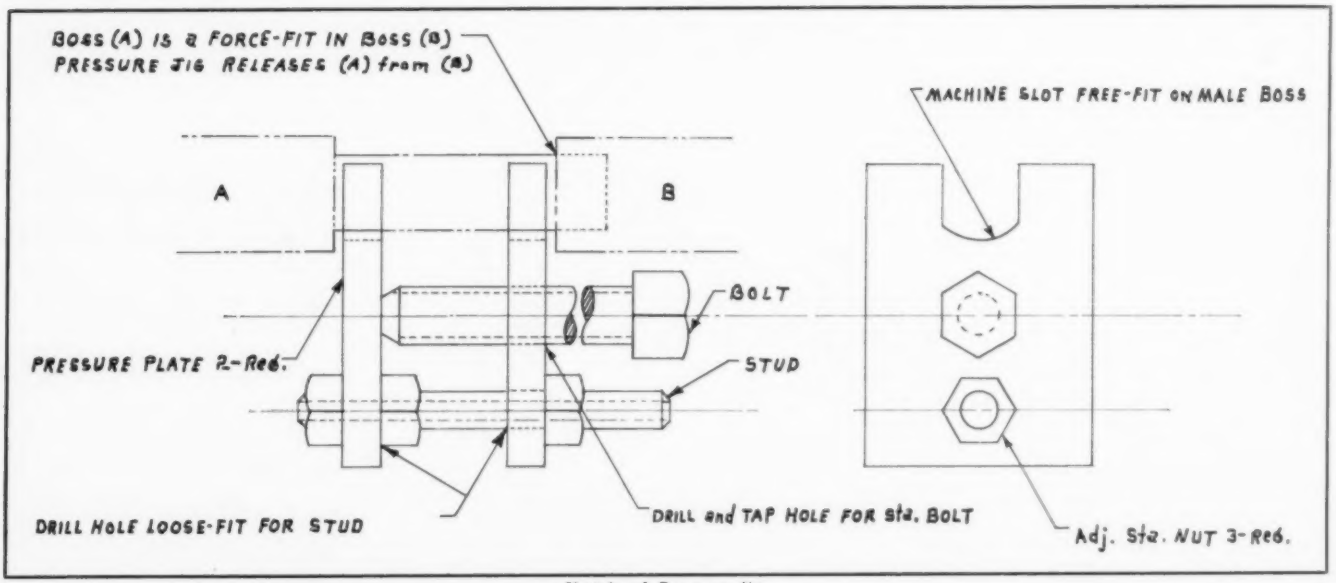
Ideas . . .

Pressure Jig

By ROBERT HILL

● We had some repair jobs to do on a large industrial machine, and most of the machine had to be taken apart in order to make new piece parts.

The following illustration shows a pressure jig that we used to remove adjoining members (A)-(B). As the machine was too large to bring into the building the work pieces had to be carried to the machine. There was no device handy that would remove Boss (A) which is a tight-fit in Boss (B), so the pressure jig, as shown, was quickly made by drilling and tapping holes for standard bolts in the two pressure plates. The diameter of the male boss is taken and a slot is machined at one end of the plates for a free-fit of the boss. In operation the pressure jig is held at right angles to the bosses and the slot is placed between the two shoulders on the Boss (A). The bottom bolt or stud doesn't have the hole tapped, but is a loose-fit in same, so when the upper bolt, which has a hole tapped, supplies pressure that compels the two plates to move away from each other, as Boss (A) slips free from Boss (B). The pressure jig works on the order of a regular parallel clamp.



Sketch of Pressure Jig.

Another **fine** product made **finer** . . .

with the PARAMOUNT "Finishing Touch"

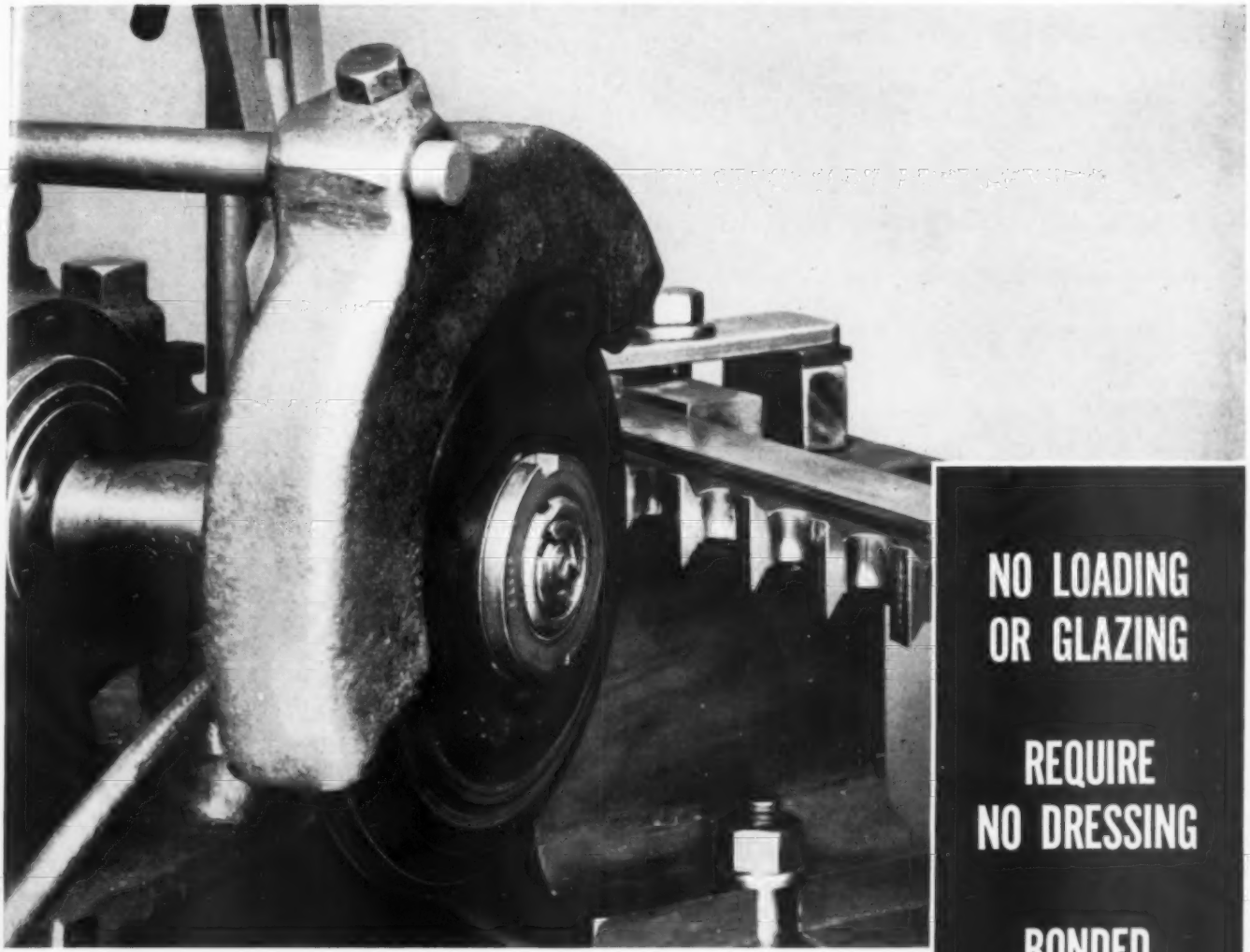
MacGregor Golf Co. uses Paramount Felt Wheels as contact wheels for abrasive belts in finishing golf clubs. "They last longer than other contact wheels," says MacGregor's Albert F. Armstrong. "They are the only wheels that will hold up for small work and give a fine finish. Hardness is important in our operations and I find we can get a Paramount Felt Wheel in the exact hardness we require. When the wheels are worn we dress them down for use in other operations. Other wheels give only ¾" use, then require a new tire."

For precision finishes so important to your product's appearance, always specify Paramount Felt Wheels. Call your jobber today.

Paramount
Felt Wheels,
Bobs, Sheet Felt

Bacon Felt Co. 417 West Water St., Taunton, Mass.

Use postpaid card. Circle No. 226



NO LOADING
OR GLAZING

REQUIRE
NO DRESSING

BONDED
FOR SPECIFIC
GRINDING
REQUIREMENTS

NATURAL
OR MAN-MADE
DIAMONDS

MANHATTAN DIAMOND WHEELS

CUT FASTER, COOLER . . . LONGER

Every Manhattan Diamond Wheel is specially *bonded* to assure precision grinding at top speed without loading or glazing. Resinoid bonded for tungsten carbide grinding, they cut cool and free with lightest pressure . . . eliminate danger or damage to heat-sensitive carbide. Special metal bonds give you the finish you want for glass, quartz and ceramics. They require no dressing — for either wet or dry grinding.

Manhattan Diamond Wheels give you faster, cooler cutting action *plus* higher wheel efficiency and longer life on the toughest jobs. Specify from Manhattan's wide variety of surface-contact shapes . . . in the diamond concentration and grit size best suited for your surface, cylindrical, or internal grinding operations. You get "More Use per Dollar" with Manhattan Diamond Wheels.

RM 947

GRINDING WHEEL INSTITUTE MEMBER

WRITE TO DIAMOND WHEEL DEPARTMENT

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Belts • Hose • Roll Covering • Tank Linings • Industrial Rubber Specialties • Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

Use postpaid card. Circle No. 227

MATTISON
HIGH-POWERED PRECISION
GRINDING METHODS

New Quick-Tilt© spindle can increase your grinder production 50%

Converts from roughing to finishing in seconds

Until now, users of vertical-spindle surface grinders have had to compromise either accuracy or production because of the difficulty in tilting the wheel spindle. In fact, to combine high stock removal with fine finish and flatness meant paying for two operations instead of one.

Now it is possible to tilt the spindle by just turning a selector switch. You have power-tilting to eliminate wheel drag when roughing, yet in a matter of seconds the grinding wheel can be reset to the flat position for finish grinding.

Simple, isn't it? You might even ask: "Why didn't you think of this ten years ago?" Actually, the real significance of this feature lies in the new thinking about surface grinding as a stock removal operation. Ten years ago grinding was considered a finishing process. Therefore, it was not until we had proved the direct and indirect cost savings made possible by grinding from the rough that the need for power-tilting spindles became imperative.

Production tests in our Methods Laboratory show that the average grinding operation can be at least 50% more efficient—that's comparing one machine with the wheel set flat against one on which the cycle is divided between roughing and finishing. But, the profit significance of power-tilting shows up more dramatically when *grinding* through outer scale and burned edges instead of milling or planing.

How to increase stock removal

With a tilted spindle your motor horsepower is applied over a smaller wheel area for greater grain penetration. This produces a bigger chip. You can use harder wheels and still get breakdown.

Fig. 1—Turning the selector switch automatically tilts the spindle .010 in. toward the leading edge, or back to dead flat.

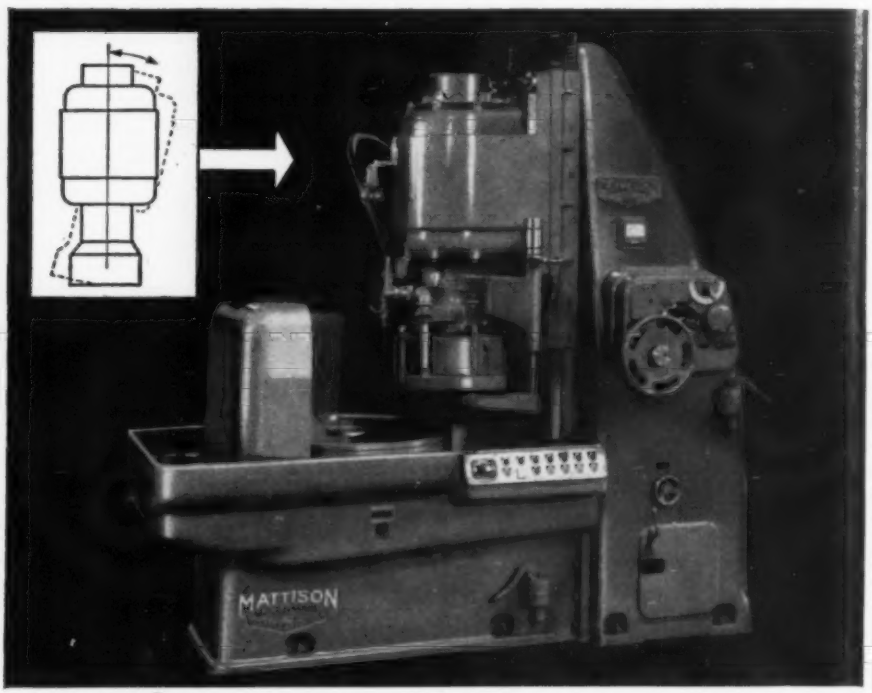


Fig. 2—Quick-Tilt© spindles solidify all the accuracy and stock removal features built into Mattison No. 24 and 36 rotaries. These machines are being built with spindle motors up to 60 hp to provide optimum cutting speeds on stock-removal operations.

With modern casting and forging techniques, there is no reason why stock allowances should not be specified for rough grinding of flat surfaces. This means a saving of approximately 50% of the stock allowance normally required for tool or cutter finishing. If close tolerances or finish are requirements, think of the dual advantages by grinding.

Hard spots, scale, and burned edges are no problem. We can show you examples of savings on parts such as bolster plates, forging dies, pump castings, and forged steel chain links.

Increases accuracy of small parts

With the practical elimination of curvature during the finish grind, more small parts can be ground per table load and setups can be speeded because the work need not be centered in relation to the wheel "ellipse." You use the same, easily adjusted clearance for every job. Leave enough stock for finishing and it is possible to grind over the full diameter of the wheel and still hold precision tolerances on all parts whether they're located at the outer edge or under the low point.

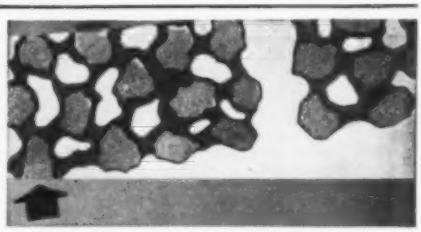


Fig. 3—Tilting the spindle reduces contact area between segments and work, permits use of higher horsepower and harder wheels. Slight bevel at leading edge reduces contact area for finishing.

See a demonstration

We are producing perfect diamond finishes on parts having large, uninterrupted surfaces. We can show you production savings, wheel life, and accuracy on test jobs or your own. Your Mattison dealer will make all the arrangements.

MATTISON MACHINE WORKS
Rockford, Illinois Phone 2-5521

Want more information? Send for new catalog describing Quick-Tilt spindle and other exclusive features of Mattison's Nos. 24 and 36 Vertical Rotarys.

MATTISON **HIGH-POWERED PRECISION SURFACE GRINDERS**

Use postpaid card. Circle No. 228

Grinding and Finishing

MARCH, 1959

READER SERVICE CARD

Tear out and mail this card!

Please have information sent me on all items I have encircled.

Your Name..... Title.....

Company .....

Address .....

City..... Zone..... State.....

Product Manufactured .....

ADVERTISEMENTS

201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290
291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310

EDITORIAL ITEMS

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

What article in this issue interested you most?_____

What subjects would you like to see published in future issues? _____

These Reader Service Cards are for your convenience. They will assist you in getting the additional information you require about any editorial item or advertisement. Because of the speed with which thousands of cards are processed each month it is essential that the blanks be filled in accurately and completely. This will save time and speed the information to you.

Please use only one Reader Service card and let one of your colleagues use the other.

Grinding and Finishing

MARCH, 1959

READER SERVICE CARD

Tear out and mail this card!

Please have information sent me on all items I have encircled.

Your Name..... Title.....

Company .....

Address .....

City..... Zone..... State.....

Product Manufactured .....

ADVERTISEMENTS

201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290
291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310

EDITORIAL ITEMS

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

What article in this issue interested you most?_____

What subjects would you like to see published in future issues? _____

FIRST CLASS
Permit No. 13517
New York City, N.Y.

BUSINESS REPLY MAIL
No Postage Stamp Necessary if Mailed in the U.S.

Postage will be paid by

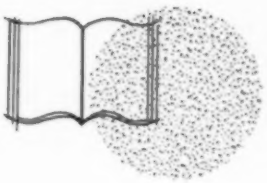
GRINDING and FINISHING
A Hitchcock Publication
P.O. Box 76, Village Station
NEW YORK CITY, NEW YORK

FIRST CLASS
Permit No. 13517
New York City, N.Y.

BUSINESS REPLY MAIL
No Postage Stamp Necessary if Mailed in the U.S.

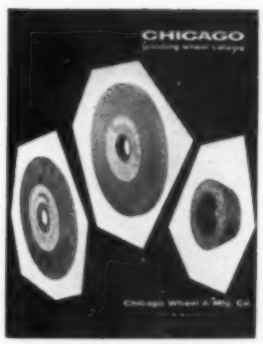
Postage will be paid by

GRINDING and FINISHING
A Hitchcock Publication
P.O. Box 76, Village Station
NEW YORK CITY, NEW YORK



Literature

1. Grinding Wheel catalog available covers a complete range of sizes, shapes with prices for industrial application. Bulletin No. 7525 includes vitrified, resinoid and rubber bonds in cut-off, straight, recessed and plate-mounted wheels. Recommended applications are also given. Important in the line are Chicago Flex and BR (break resistant) wheels for portable grinding, weld and metal fabrication, finishing, portable cement grinding, notching and plastic grooving. Chicago Wheel and Manufacturing Co., 1101 West Monroe St., Chicago, Ill.



(See Number 1)

2. Granite Surface Plates. Surface plates in no-ledge, two-ledge and four-ledge types, toolmakers' flats, straight edges, surface plate stands, parallels and angles are illustrated in brochure with sizes included. Small toolmakers' flats to large 7' x 14' surface plates are available. Composed of black granite for greater stability and rigidity, accuracy of the surface plates is said to be held down to 25 millionths. Pratt & Whitney Co., Inc., West Hartford 1, Conn.

(See Number 2)

3. Drill Grinder. Bulletin No. 4102 describes the Sellers 1-G drill grinder as grinding either straight or tapered shank right hand two-lip twist drills .028" (No. 70) to ½" dia. to any included angle of point from 80° to 160°. Illustrations demonstrate the Sellers four simple steps to scientifically correct drill points. The self-contained dry grinder is a bench type with direct connected built-in motor. Standard accessories include two standard chucks, point thinning attachment, etc. Extra accessories are offered also. Consolidated Machine Tool Div., Farrel-Birmingham Co., Inc., Rochester 10, N.Y.

(See Number 3)

4. Bibliography on Silicon Carbide. A limited number of a new comprehensive bibliography on silicon carbide has been compiled by Kenneth M. Merz of the Research and Development Division, The Carborundum Co., Niagara Falls, N. Y. Prepared in response to numerous requests for information on silicon carbide, it is a 107-page listing of scientific literature on the subject. Authors are listed alphabetically. Subject keys are listed in the forefront and in the margins by each author listing.

5. Pneumatic Comparator Gages. An entirely new line of air gages for dimensional measurement and a series of automation building-blocks for size-control systems is presented in Catalog 8008. It covers newly-standardized purchasing data on pneumatic plugs, rings, and gaging cartridges, including the Moore Hardcoat (anodized aluminum) plug and the L-Matic (low-force) cartridge. Described are the Model 814H comparator (high amplification unit) for full-scale ranges of 0.0004" to 0.002", and the Model 814 for full-scale ranges of 0.001" to 0.120". Helpful diagrams, illustrations and specifications cover the equipment offered. Index tabs locate the product desired. Moore Products Co., H & Lycoming Sts., Phila. 24, Pa.

6. Free Test Cutting Service. An 11-page illustrated brochure describes the two new demonstration-test centers now in operation by The DoAll Co. for industry. Test cutting of actual workpieces submitted by customers permits an accurate appraisal of cost per cut, tool life, and production rates before the actual purchase of a DoAll machine tool. One of the centers, equipped with the largest type vertical and horizontal band machines, is located near Minneapolis. The results of 28 actual tests are given. The smaller band machines, surface grinders, power saws and other facilities of the second center are also illustrated, along with full information concerning this service. The DoAll Co., Des Plaines, Ill.

7. Diamond Saws and Wheels for applications in fibreglas are available in standard types, or special shapes to customer specifications. Illustrations, diagrams and specifications are given in brochure. All blades are available slotted or unslotted. For large diameters with a very thin cutting edge, the reinforced center, or collar, is dimensioned to suit depth of cut. The cut-off wheels are available with grit

(See Number 5)

FREE LITERATURE *continued*

sizes ranging from No. 40/60 mesh, for fast rough cutting, to No. 80/100 for extra fine finish cutting. Metal bonded diamond hones and files are described, with prices listed. O'Rourke Diamond Co., 11423 Vanowen, North Hollywood, Calif.

8. Precision Finishing Processes. Suggestions for ways to improve and expand barrel finishing and wet blasting processes are presented in the second issue of "Techline Finishing Progress." Attention is centered on the problem of returning "orphan" precision finishing machines to productive work. Other stories describe the experience of several companies who have improved performances and reduced maintenance costs with wet blasting equipment. The new Techline laboratory for test finishing is also described and illustrated. Techline Div. of Wheelabrator Corp., 1169 Avenue V, Vicksburg, Mich.

(See Number 9)

9. Heavy Duty Roll Grinder. Illustrated brochure shows the new Farrel HD type cylindrical grinder installed in the Westerly, R.I., plant of The Cottrell Co., a subsidiary of Harris-Intertype Corp. of Cleveland. The machine is reported to grind bodies of cylinders of any diameter from 5" to 75", and their tapered journals without disturbing the work setting. Tapers can be ground up to 30" long and 1" per foot on dia., with micrometer adjustment for carriage reversal. Accuracy of diameter concentricity to within .0002" and finishes of 2 micro inches are reported. Farrel Birmingham Co., Inc., Ansonia, Conn.

10. Water Swivels and Diamond Core Drills. As described in recent folder, the water swivel is used, primarily, for diamond drilling in glass, hard-fired ceramics, tile, stone, concrete and holes in any hard brittle material. The heavy duty model accepts drills from 1" to 3" in dia., the medium model, 3/16" to 1" in dia. A special adapter is available for attachment to the water swivels. Koebel CDP (cemented diamond particles) diamond core drills, in a wide range of sizes for varied applications, are also available. Koebel Diamond Tool Co., 9456 Grinnell, Detroit 13, Mich.

11. Coated Abrasives Products. A new, practical information kit to make it easier to specify and order coated abrasives is now available. In the kit is a Buyer's Guide, Form A 1506, with convenient reference tables and forms for listing requirements; a Selector Chart for Metalworking Operations, including materials and applications, with the recommended types of belts, discs, sheets or rolls; a compact brochure, Basics in Coated Abrasives for the Metalworking Trades, Form A 1509, a comprehensive chart of recommendations by Carborundum for various types of metals and operations on these metals. The Carborundum Co., Niagara Falls, N.Y.

12. Twist Drill Grinding Machine. A short, comprehensive brochure describes the Meteor (CH-1) small twist drill grinding machine as used for sharpening right and left hand twist drills and milling cutters ranging in sizes from 0.008" to 5/16" in diameter. It is reported to give accurate grinding of point angles from 90° to 180° and relief angles from 0 to 20°. Provided also is a discussion of the machine's capabilities, an extensive technical data, listings of standard equipment and special accessories. Carl Hirschmann Co., Inc., 30 Park Ave., Manhasset, N.Y.

13. Flexible Shaft Machines and attachments are discussed in available literature. Illustrations and dimensions cover single speed and multispeed models. There are three types of machines—floor, bench stand, and suspended. The machines are well balanced to take the weight of the attachments off the operator's hands. Horsepower, speeds, and prices are provided for the machines, sizes and prices for the cores and cases, as well as prices on the handpieces, angleheads and wheel guards. B. W. Elliott Mfg. Co., Inc., 350 State St., Binghamton, N.Y.

accent on Accuracy!

Whitnon HIGH FREQUENCY ELECTRIC Spindles

Modernize your present internal grinders and special milling machines with Whitnon High Frequency Electric Spindles

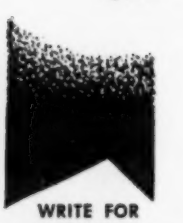
It's the accent on accuracy that gives this missile perfect performance at high speeds

It's the *accent on accuracy*, too, that builds perfect high-speed performance into Whitnon High Frequency Spindles. Whitnon Spindles deliver maximum — and vibrationless — horsepower to all grinding wheels and tools . . . at speeds from 10,000 to 120,000 RPM.

Spring pre-loaded and dynamically balanced after assembly, they assure you better control of finish and size — faster stock removal — and the high quality production that earns you higher profits.

IN STOCK TO FIT MOST GRINDERS
8 HP at 10,000 RPM to ¾ HP at 120,000 RPM

Available for:
- HEALDS
  - 3" Center Height
  - 3½" Center Height
  - 4" Center Height
- BRYANTS
- Special spindles for duplicating, wood and non-ferrous routing, synthetic textiles and spin testing.



WRITE FOR LITERATURE TODAY.

THE Whitnon MANUFACTURING COMPANY
ROUTE 6 AND NEW BRITAIN AVE., FARMINGTON, CONNECTICUT

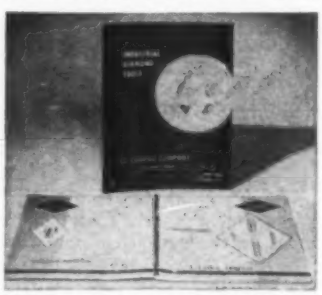
Use postpaid card. Circle No. 229

14. **Continuous Filtration.** How Hoffman Vacu-Matic filters employ a new vacuum method to provide unusually high flow rates in continuous filtration of machine tool water soluble oil coolants is described in recent brochure. The two models discussed are the VAC 40A and the VAC 80. Automatic and self-cleaning, the filter is said to make high speeds, faster feeds, and better finishes possible as it removes all chips abrasives, dirt, and other solid contaminants with minimum coolant loss and greatly reduced shut-down. U.S. Hoffman Machinery Corp., Dept. LR, Thompson Road Plant No. 1, Syracuse, N.Y.

15. **Basic Jigs & Fixtures, Full-Size Tracing Templets.** Jumbo catalog, 24"x18", on basic jigs and fixtures, makes possible the inclusion of 70 full-size tracing tem-

plets. The templets are printed in red ink so that the draftsman can easily trace every line and dimension. Indexed for easy reference are full-sized tracing templets, parts numbers and other information which facilitates ordering. Illustrated are mill fixture bases; gang fixture bases; "T" angle plates; cast iron box jigs; heavy-duty type box jigs. The new line of aluminum "tumble" box jigs is described and illustrated also. Standard Parts Co., 1040 Broadway, Bedford, Ohio.

16. **Diamond Tools.** A broad line of industrial diamond tools is illustrated and described in 20-page catalog, providing selection of the proper quality, size and shape diamond and the formulation of special



alloys and setting materials. Single point diamond dressers are shown for straight dressing and for radius dressing and the application of the various types is described. Other Landau products illustrated and described include: hardness testing diamonds, boring and turning tools, gear grinding dressers, thread grinding tools, to name a few. Information on the choice of the correct tools and instructions for their use and care are also given. A. Landau Co., 247 S. Ninth St., Phila. 7, Pa.

17. **Roll Grinding** is highlighted in Bulletin No. 2533-JJ58. The Blaw-Knox Medart roll grinders are especially designed for accurate, resurfacing or contouring of Blaw-Knox Medart straightening or polishing

TURNIT

TURNOVER ---------- HERE

Assures

50% LESS

TURNOVER HERE

where it really counts

TURNIT, makes *correct* rotation of diamond tools a simple effortless operation; saves 50% and more in diamond tool cost.

Now you can get a better wheel finish, closer work tolerance, longer wheel life and, at the same time, eliminate wheel glazing and minimize grinding wheel heat, cracks and fractures.

There is a TURNIT for almost every grinding application on all types and models of grinders. Whether you wish manual or automatic operation, internal or external installation call or write for recommendations.

For further information ask for your copy of the new Turnit bulletin.

J. K. Smit are also manufacturers of diamond tools, diamond wheels, diamond drill bits, diamond lapping compound and diamond powder.

SUPER MATERIAL IGNIS TRIUMPHANS
EST. 1888

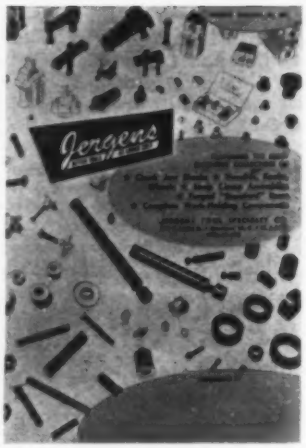
J. K. SMIT & SONS, INC.
Murray Hill, N. J.
TORONTO • • • DETROIT

Use postpaid card. Circle No. 230

rolls. Provision is made for grinding to templates. Either straight or concave rolls may be dressed with minimum supervision. Bar and tube machinery is well described and 28 pictures point out the advantages. Included are billet peeling and chipping, centerless turning, bar and tube straightening, etc. Foundry and Mill Machinery Div., Blaw-Knox Co., 300 Sixth Ave., Pittsburgh 22, Pa.

18. "Standards" for Tool, Die, Jig, and Fixture Design. An 84-page catalog, reported to be a complete source for data on all the "standards" for tool, die, jig, and fixture design and applications, is available. Complete specifications and cost-saving data are given on over 2,000 standards, including comprehensive line of work-holding equipment, chuck jaw blanks, handles, knobs, wheels, strap clamp assemblies, forged items, plus hundreds of other jig and fixture components. Detailed specifications and engineering drawings with tracing templates available are also covered. Jergens Tool Specialty Co., 712 East 163rd St., Cleveland 10, Ohio.

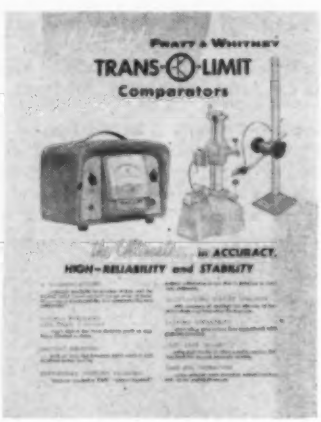
19. Machines Lap, Roll Burnish, Fillet Roll Shafts. Circuluar 512 illustrates and describes the complete Footburt-Schraner line of bearing-surface finishing machines for straight shafts, crankshafts, and camshafts. Included are models A, B, HD, and SFA lapping machines; models A, B, HD, DER, and SER fillet-rolling machines; and models SF and SFB machines which can lap, fillet roll, or roll burnish. The model SF is a new manually loaded machine. The model SFB is a just-announced automatic counterpart of the SF, equipped with loading and unloading



(See Number 18)

devices so the machine can be used in integrated production lines. All Footburt-Schraner lapping machines utilize coated-abrasive cloth. Schraner Div., The Foote-Burt Co., Cleveland 8, Ohio.

20. Comparator With Four Magnifications. Folder available from Pratt & Whitney Co. describes the Trans-O-Limit comparator which changes to any one of four magnifications by means of a selector switch—.0005", 8400X; .001", 4200X; .005", 840X; .010", 420X. This gage line includes the cabinet, height gage, external comparator, cartridge units and



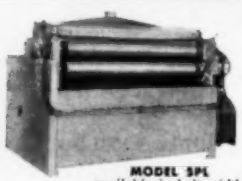
snap gages which are described and illustrated, with specifications for each well covered. Fast, easy set-up is reported possible, using gage blocks or other suitable master. A 5000 cps operation claims to provide more complete miniaturization and lighter gaging pressures. Pratt & Whitney Co., Inc., Charter Oak Blvd., W. Hartford 1, Conn.

21. Air Operated Diaphragm Chucks. Illustrated with photographs, sectional views and dimensional drawings, the four-page bulletin gives detailed information and full specification data on the three basic Erickson models comprising the line. Erickson Tool Co., 34350 Solon Rd., Solon, Ohio.

22. Barrel Finishing Equipment. Fourteen standard units, two small barrel models and 11 specialized barrel finish-

"Only machine capable of handling our rugged and precision sanding requirements on large aluminum panels"*

*Reported by
N. B. Barsha, Plant Engineer
Cupples Products Corp.
St. Louis, Mo.



MODEL SPL
available in belt widths of 24", 36" and 50"
Sanding action is for underside of work.

MODEL TOP
available in belt widths of 24", 36", 50" and 54"
Sanding action is overhead.

"We were faced with the problem of sanding 1000 vertical aluminum panels, 28'x24"x$\frac{5}{16}$" for the exterior of the new U.S. Air Force Academy buildings. These panels required finishing to a uniform and precision surface specification. Before we purchased the Timesaver Model TOP-50, we thoroughly investigated the market for sanding machines of this type. The Timesaver "Speedbelt" was the only unit which possessed the durability, accuracy and rugged construction necessary for our requirements."

The Cupples Products Corporation's experience is typical of Timesaver "Speedbelt" Installations throughout the country . . . where performance and need to achieve production and cut costs is important. They can do all flat metal surface finishing, polishing and sanding formerly assigned to other methods . . . and do them better. What's more, savings made in labor, materials and maintenance soon pay for their low initial cost.

Investigate the advantages of Timesaver Sanders for your plant, write for literature and information today.

TIMESAVER SANDERS
P.O. Box 7446, Robbinsdale Station • Minneapolis 22, Minn.
Pioneers in Wide Belt Sanding for the Woodworking Industry
Use postpaid card. Circle No. 231

ing machines are described in a four-page illustrated brochure. The firm's complete line of barrel finishing compounds and media is also described. Specifications for several typical machines are included. Almco's barrel lining replacement plan is also outlined in the brochure, along with the firm's standing offer of free sample processing of parts in their test laboratories. Almco, Albert Lea, Minn.

23. Grinding Wheels. Literature available tells how to order American grinding wheels, with an explanation of the standard markings for grinding wheels. Shapes of the various wheels are clearly diagrammed. Two pages cover the five characteristics of the grinding wheels and hints for their proper selection. Wheel speeds—conversion table is included also. The grinding wheel recommendations cover the material and job, wheel marking, abrasive and bond. The American Emery Wheel Works, Providence, R.I.

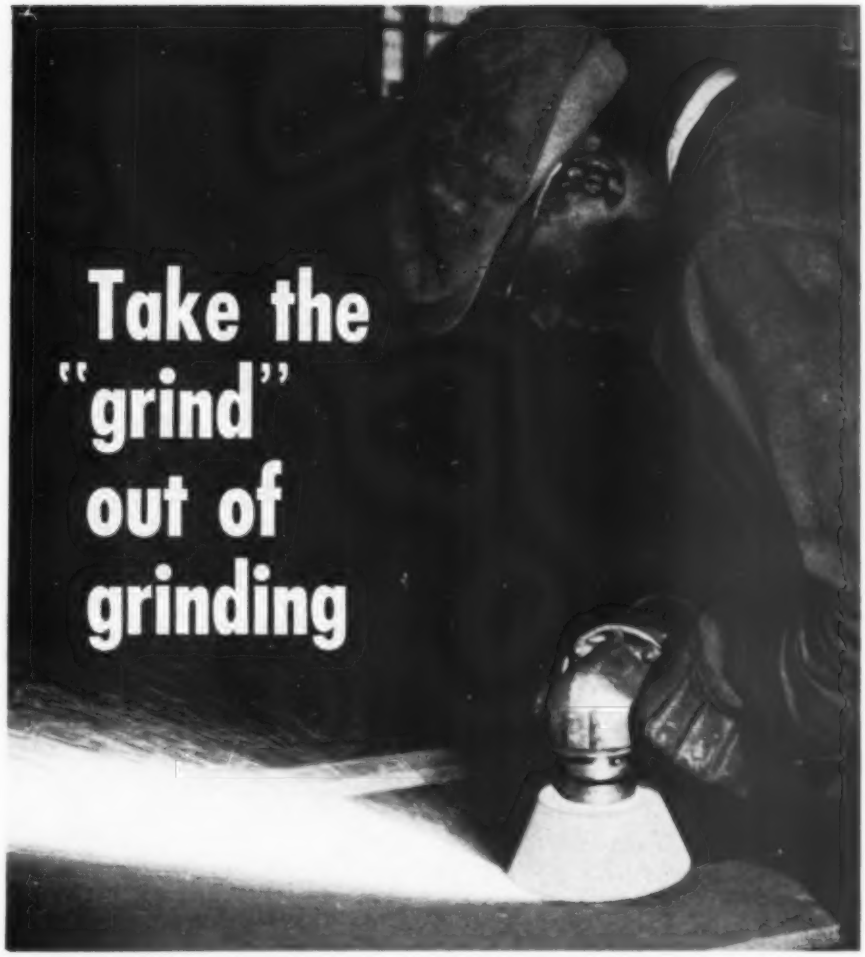
24. "Permag Compounds for Barrel Processing." This booklet on the Permag compounds contains indexed information on processes, materials, and case histories. Supplemental sheets have been prepared for insertion in the book, which was issued last year. This information covers several new compound-abrasive materials used alone or with usual large media to provide better cutting, deburring and removal of flash. Case histories cover such subjects as deburring of aluminum, steel forgings and zinc die cast; also coloring of steel stampings, aluminum castings, and bronze. These new items are noted on a supplemental index. Copies of the sheets or the complete book are available. Magnuson Products Corp., 50 Court St., Brooklyn 1, N.Y.

Reprints Available

Abrasive Cutting
Better Diamond Dressing for Precision Grinding
Eliminating Edge Breaking by Ultrasonic Cutting
The Cleaning of Grinding & Finishing Coolants ..... .25
By Arthur L. Wilson

GRINDING and FINISHING
Hitchcock Publishing Co.
Wheaton, Ill.

"Hang it all, Fester. I thought you said you understood 'plunge grinding.'"



ATLANTIC WHEELS

Fast cutting and smooth floating action of Atlantic Grinding Wheels calls for less pressure and fewer passes . . . reduces worker fatigue and increases efficiency. Good reasons why you keep cutting costs down with Atlantic Wheels.

Atlantic Abrasive Corp.

A DIVISION OF ABRASIVE PRODUCTS, INC.
South Braintree 85, Massachusetts

STRAIGHT WHEELS • CYLINDER WHEELS • CUP WHEELS
CONES • PLUGS • MOUNTED WHEELS AND POINTS

☐ Please send Atlantic Abrasive Catalog.
☐ Have Sales Engineer call without obligation.

NAME .....
POSITION .....
COMPANY .....
STREET .....
CITY ..... STATE .....

Use postpaid card. Circle No. 232

BARNESDRIL #2 Magnetic Separator installed on a cylindrical grinder.

coolant separator increases production 15%

pays for itself in less than 9 months

Automatically separating ferrous particles from coolant with a #2 BarnesdriL Magnetic Separator and recirculating it, has produced a saving of $20.00 per week* on this cylindrical semi-automatic grinder.

Benefits such as improved finish, less downtime and less coolant waste were immediately noticeable. Additional benefits, such as the reduction of dermatitis and increased operator comfort, were noted only after the coolant separator was in operation some time.

These benefits are typical of the savings and benefits accrued when a BarnesdriL separator is installed. Call your BarnesdriL Factory Representative today or write for Catalog 350.

*** SAVINGS PER WEEK:**

3¼ hrs Cleaning Time
3¼ hrs Operator's Time
1.87 gals. Coolant
25% Wheel Life

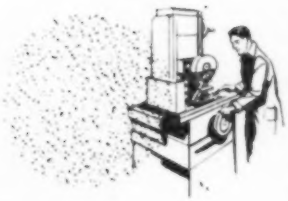
FILTRATION DIVISION

BARNES DRILL CO.

866 CHESTNUT STREET • ROCKFORD, ILLINOIS
DETROIT OFFICE: 13121 Puritan Avenue

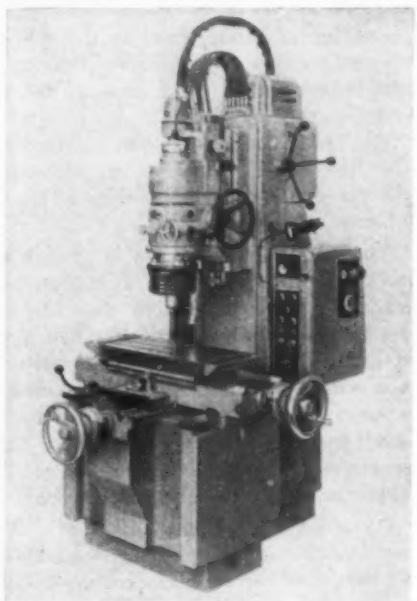
MANUFACTURERS OF MAGNETIC COOLANT SEPARATORS • KLEENALL SEPARATORS AND FILTERS • CENTRAL COOLANT CLEANING SYSTEMS

Use postpaid card. Circle No. 233



Equipment and Materials

Grinder Has Table Surface 11"x24", 18" Height Allowed



Finer tolerances in the finish-grinding of tools for the missile era are said to be provided by the No. 3 Moore jig grinder, which offers a greater range and larger table than its No. 2 predecessor—11" x 24" x 18" height. It will grind, with split-tenth accuracy, straight or tapered holes and regular or irregular contours to size and location after hardening, the manufacturer claims. It also provides this same efficiency for slot-grinding and chop-grinding operations. Spindle speeds are reported within the range of 40 to 250 rpm.

Other features of the machine include: hardened, ground and hand-lapped steel ways, which eliminate gibs and overhang; more accessible cross-clamping; micro setting of the vernier dial, and quick setting precision lead screws. The grinder conforms to JIC standards.

Moore Special Tool Co., Inc., 800 Union Ave., Bridgeport 7, Conn.

Use postpaid card. Circle No. 25

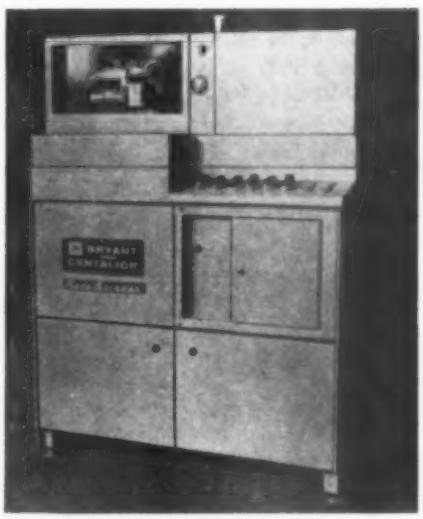
Miniature Centalign Internal Grinder

The Bryant miniature centalign Model B internal grinder features a disc drive shoe centerless fixture by which workpieces are automatically loaded, ground and unloaded. This provides for interchangeable "packaged tooling" which can be set up away from the machine if desired. This allows almost uninterrupted machine operation.

The compact machine, requiring only 8¼ sq. ft. of floor space, was built specifically for grinding bores in miniature bearing races and internal ball tracks in miniature bearing outer races.

A complete range of bores and raceways in miniature bearing races up to .625 OD can be ground by means of the centerless fixture, the manufacturer claims.

Other features include automatic new wheel dressing and automatic loading and unloading, which allows one operator to operate several of these machines at the same time; and separate variable cross feed speeds for both rough and finish grind operation, and selective skip dressing.

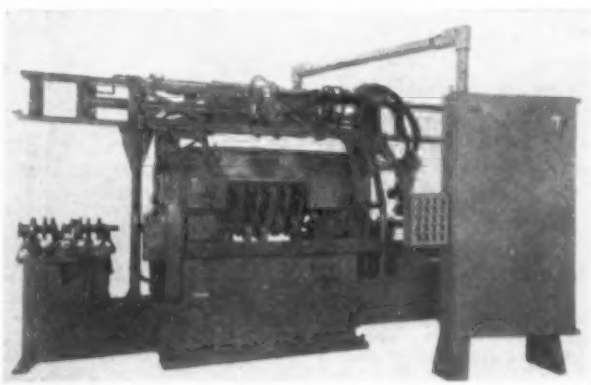


The Bryant Chucking Grinder Co., Springfield, Vt.

Use postpaid card. Circle No. 26

Crankshaft Machine Laps, Fillet Rolls, Roll Burnishes

The Footburt-Schraner model SFB is a completely automatic machine for lapping or roll burnishing bearing surfaces on crankshafts and for fillet rolling stress-concentration points at diameter changes. Attachments provide for lapping thrust surfaces if desired. All lapping operations are performed by coated-abrasive belts.



The machine is equipped with a hydraulically operated, automatic loading and unloading device to equip the machine for use with integrated production lines. Crankshafts feed to the loading station from a conveyor. The load and unloading stations are integral.

In one installation, the model laps all pin bearings, main bearings, and thrust faces, and roll knurls wiper grooves on an oil-seal diameter. Pro-

duction is reported as 60 pieces per hour at 80% efficiency, with a resulting finish on the lapped surfaces of five to seven micro inch.

The thrust faces are lapped by narrow coated-abrasive belts which are held in contact with the thrust faces by spring pressure from special attachments which float on the lapping-head arms.

Knurling is done by a hydraulically actuated auxiliary head which rises from below the work. The fillets and bearings surfaces are lapped simultaneously. Fillet rolling is done in a separate operation. Roll burnishing is done after, or instead of, lapping, to produce a very smooth, slightly cold-worked surface for longer bearing life.

The model has a 15" swing and will accept work up to 36" long. Up to 16 heads can be provided. Each can lap a bearing and a fillet and thrust surface on each side.

The hydraulic system is separate; a 3 hp motor is provided for lapping and fillet rolling; roll burnishing requires a 5 hp motor. The hydraulic system is low pressure: 150 psi for lapping and fillet rolling, 300 psi for roll burnishing.

Floor space for the model, with its loading and unloading stations, but exclusive of the electrical control station, is 14' x 5'5"; height is about 10'.

Schraner Div., The Foote-Burt Co., Cleveland 8, Ohio.

Use postpaid card. Circle No. 27

Attachment Laps Dish Angle of Blades on Cutters

The Herbert face milling cutter lapping attachment is designed for lapping the dish angle of inserted blades on face milling cutters.

To obtain the necessary relationship between cutter and workpiece, it is necessary to lap the cutter in position on the spindle from the machine table

correcting any inaccuracy in the spindle and cutter. To achieve this, an attachment bolted to the machine table enables the operator to obtain the proper relationship and also to restore the fine lapped finish to the blades. Almost continuous machining is possible.

The portable attachment is available as a single wheel unit. Provision is made on the attachment for fitting the lapping wheel at either end of the spindle, enabling lapping in any position within the limits of the attachment when used on vertical or horizontal single-spindle milling machines. A separate wheel and indexing box provides for use on multi-spindle machines.

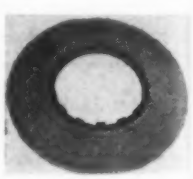
Although graduations are at 90° intervals, extra graduations can be added for intermediate angles if required. On machines not fitted with a neutral spindle position or machines on which the cutter is difficult to turn a dial indicator gauge should be used.

Dish angle is determined by means of the dish angle micrometer, each graduation representing .0005" in 1¼" or one 48th of a degree.

Alfred Herbert Ltd., P.O. Box No. 30, Edgwick Works, Coventry, England.

Use postpaid card. Circle No. 28

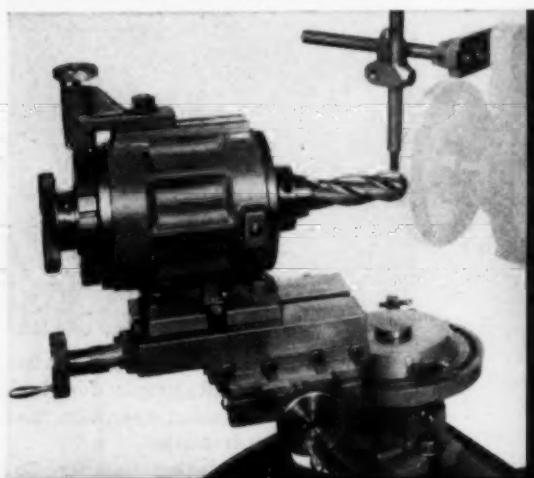
Treatment Protects Buff from Fire



The Flameproof Treatment on American Buff's cotton and Sisal buffs is said to positively retard flames. It is reported as a positive guarantee against fire hazards ordinarily unavoidable in high speed lathe operations where buffs build up heat during long periods of contact with work.

American Buff Co., 2414 S. La Salle St., Chicago 16, Ill.

Use postpaid card. Circle No. 29

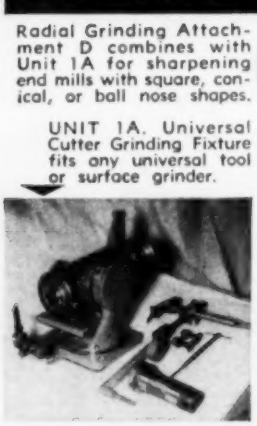


THE UNIVERSAL RADIAL CUTTER GRINDING FIXTURE

Precision ball bearing workhead 6B mounted on compound Slide for setting cutter to correct position when grinding end cutting flutes and radii. Other type workheads available.

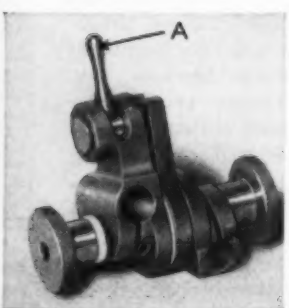
Radial Grinding Attachment D combines with Unit 1A for sharpening end mills with square, conical, or ball nose shapes.

UNIT 1A. Universal Cutter Grinding Fixture fits any universal tool or surface grinder.



UNIT 4A. Radial Grinding Fixture for sharpening fluted end mills with square, conical, or ball-nose mills. The index disc provides for multi-flute cutters.

NEW FINE-ADJUSTMENT SLIDING SWIVEL GIVES SMOOTH, PRECISE INDICATOR SETTING. Smooth, positive positioning of finest dial indicator is readily accomplished by the fine-adjustment Sliding Swivel. Final precise positioning is accurately made by slight movement of convenient lever "A"



RID

ROCHELEAU TOOL AND DIE CO. INC.

650 NO. MAIN STREET, LEOMINSTER, MASS.

WRITE FOR: SLIDING SWIVEL FOLDER

Use postpaid card. Circle No. 234

Lotion Prevents Dermatitis

Chatta, an Indian word meaning "umbrella," contains silicone and acts as a protective agent for the hands and arms against outside irritants, yet allowing the skin to breath without clogging pores. It is a soothing lubricant.

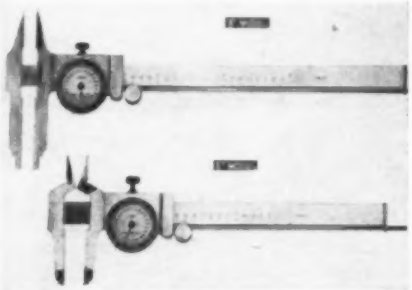
The lotion is designed for dermatitis of industrial origin resulting from water soluble cutting oils, coolants and acids, and also for prevention of dermatitis due to harsh soaps and cleaners.

Dara Products Co., 1819 Mentor Ave. (Norwood), Cincinnati, Ohio.

Use postpaid card. Circle No. 30

Direct Dial Reading Caliper

A newly designed caliper has a direct dial reading which reportedly permits measurement accuracy up to 0.001,



which can be read directly from the dial without verniers or other auxiliary scales. It is available in 0-6" or 0-8" models. The double jaws, which can be locked in position, permit inside, outside or depth measurement with equal convenience.

The tool is made entirely from stainless steel and brass. All operating components are completely enclosed, eliminating malfunction and error caused by dirt or foreign material.

All tools are supplied in a leather case; velvet lined wooden cases at additional cost. The 6" model sells for $39.90, the 8" for $42.00.

Titan Tool Supply Co., Inc., Box K, 1419 Hertel Ave., Buffalo 16, N.Y.

Use postpaid card. Circle No. 31

High Precision Block Level

This precision level features side openings for vertical as well as hori-

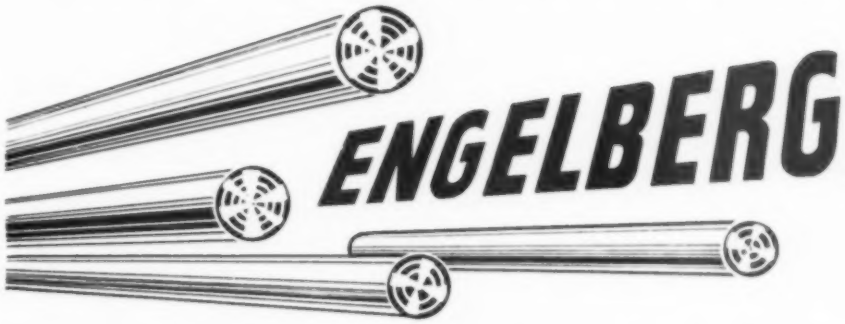
zontal observation, bubble tube protection by cover plate which also acts as an insulating grip, and adjustable ground bubble tube.

The level is available in three degrees of sensitivity: 2-3 seconds, 4-6 seconds and 10 seconds of arc, as well as four different lengths of 6", 8", 10" and 12".

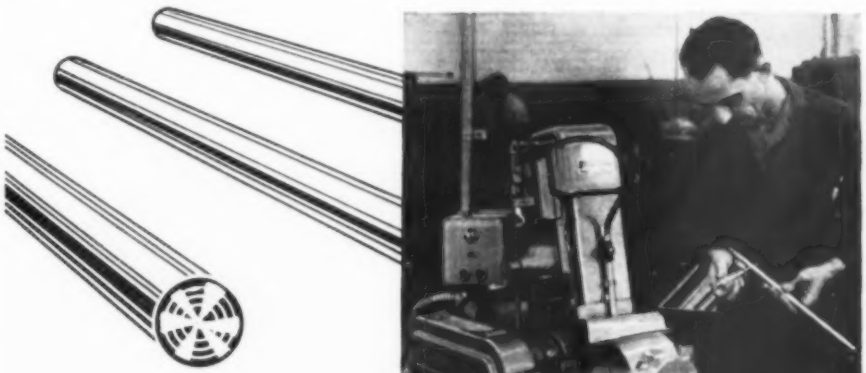
Opto-Metric Tools, Inc., 137 Varick St., New York 13, N.Y.

Use postpaid card. Circle No. 32

PNEUMATIC CYLINDER PISTON RODS GROUND TO .0005" TOLERANCE WITH . . .



CENTERLESS BELT GRINDER



The Bellows Company's Smith-Johnson Division in Glendale, Calif., makes pneumatic cylinders to power drill presses, hydro checks, rotary index tables, etc. To achieve smooth, steady action even with low air pressure, the piston rods are precision sized to tolerances of .0005" and surface finished to 8 microinches on an Engelberg Model L-4 Centerless Belt Grinder.

With this Engelberg Grinder parts are through-fed at 84" per minute, average belt life is 1200 production feet, and belt changes take less than a minute. The result – a 300% production increase.

Abrasive belt grinding can help you solve your surfacing and finishing problems. This technique is now recognized as one of the most rapid, economical and versatile for stock removal, precision sizing and fine finishing of almost any material. Engelberg Methods Engineers will welcome the opportunity to study your problem. Just send us drawings or typical pieces for operational analysis.

Write for production case histories with Engelberg Abrasive Belt Grinders.

ENGELBERG, INC.

Precision ABRASIVE BELT GRINDERS

186 SENECA STREET • SYRACUSE, N.Y.

Use postpaid card. Circle No. 235

Cylindrical Grinder Features Plunge Infeed As Standard Equipment

The R4 series of semi-automatic cylindrical grinders features plunge infeed as standard equipment. The R4-800U has 13¾" swing, 34" b.c., and as a universal type is equipped with a 5 hp motor. Model R4-820U universal cylindrical grinder is illustrated.

The capacity of the R4, 10" swing machine makes it suitable for many types of straight plunge or form work of the small variety not requiring larger equipment.

A full line of accessories is available.

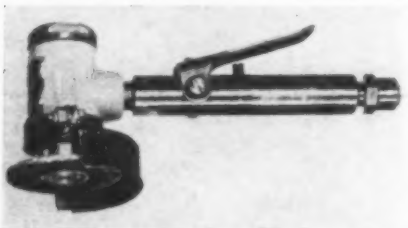
Machine Tool Div., The Olivetti Corp of America, 42-33 Northern Blvd., Long Island City 1, N.Y.

Use postpaid card. Circle No. 33

New Line of Portable Grinders

High-speed cutting efficiency and adaptability are said to characterize the small but rugged, gearless 12V-180 angle grinder. The 10" long x 4½" high air tool maintains its speed of 18,000 rpm extremely well under load and operates with a minimum of vibration, the manufacturer claims.

This tool is used with a specially-designed depressed-center cut-off



wheel with 3" capacity. It may also be used as a sander.

The Cleco 14 GEQ-140A belt grinder has an abrasive belt with a resilient spiral-tooth rubber wheel for smooth contact on the work. It cuts fast, is easily controlled and imparts good quality finish. Cleco 14 Series belt grinders are available in several models, with choice of thumb, lever, or "quick-as-wink" throttle.

Belt grinder attachments are available for 400 Series Cleco grinders also.

Other Cleco grinders include No. 11 with swivel inlet, or straight inlet, complete or with collet chuck and wheel guard.

Cleco Div., Reed Roller Bit Co., 5125 Clinton Dr., Houston 20, Tex.

Use postpaid card. Circle No. 34

No Chatter in Movement With Sturdy Height Gage

The new Hite-Cheks have been designed to eliminate chatter and other

You never knew you could do so many things with MODERN ABRASIVES!

Say goodbye to many older, costlier metalworking methods

Today, use Brightboy, the modern finishing medium that will perform many types of work previously unrelated with abrasive uses.

Brightboy's wide scope begins where conventional abrasives leave off. Its unique working action results from rubber and Silicon Carbide or Aluminum Oxide abrasive grains working simultaneously; BURRING, FINISHING, CLEANING, POLISHING, in a *single-step operation!* Readily available STOCK grains and textures are JOB-MATCHED to *your job!*

WRITE US NOW FOR

- SAMPLE BRIGHTBOY HAND TABLET
- CATALOG LISTING GRAINS, TEXTURES MACHINE SPEEDS
- NEW METHOD RECOMMENDATIONS and for name of nearest Brightboy distributor

BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.
95 North 13th Street • Newark 7, N.J.

America's Pioneer Manufacturer of Rubber-Bonded Abrasives

WELDON ROBERTS Brightboy RUBBER CUSHIONED ABRASIVES

TIME SAVING FEATURES

Works to close tolerances
Can be shaped to contour
Produces conventional and special finishes and patterns, frequently the final polish
No before-use preparation or dressing
No skilled labor required

GENERAL USES

Removing light digs, tool and heat marks
Cleaning welded and soldered joints
Burring and finishing castings, stampings, machined and molded parts
Maintenance of tools and machinery

Use postpaid card. Circle No. 236

vibration in the transfer of dimensions set up by Hite-Icators, riser blocks, gage blocks, etc. Coupled with Brown & Sharpe's Magna-Set System, they are said to provide lowest cost-per-inch of any height setting and transfer arrangement.

Utilizing a new lightweight, aluminum, tapered-box construction, uprights provide rigidity and stability in supporting any dial test indicator, in any position. Sturdy bases with hardened and lapped graphitic steel wear pads provide smooth, easy movement. Two-piece sliding heads permit quick rough settings, while positive fine adjustments can be securely clamped. Units are particularly suitable for use with high-amplification indicators.

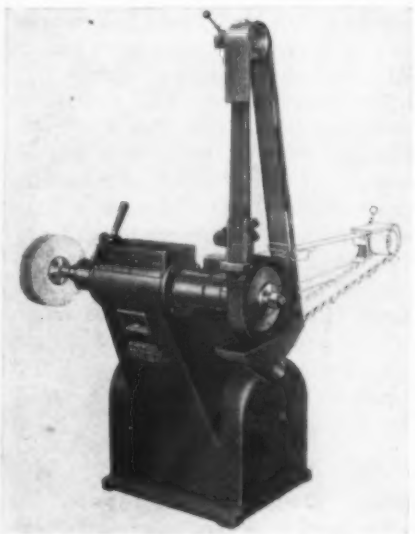
Three standard sizes are available: 24", 36" and 48" high.

Industrial Products Div., Brown & Sharpe Mfg. Co., Providence 1, R.I.

Use postpaid card. Circle No. 35

Polishing & Buffing With One Head on One Machine

Designed for use on the Hammond OK, RL and ROL polishing lathes, the



UP-2 head offers all the advantages of contact wheel, free belt and platen grinding and finishing. The head is recommended for light to medium duty polishing operations and can be furnished on either or both sides of the lathe. It takes up very little floor space, and the operator is only one step from polish to buff.

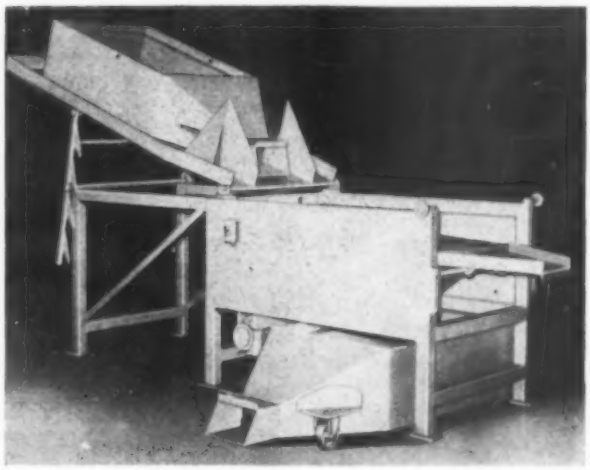
A spindle speed of 1750 rpm gives 5500 sfpm using a 12" diameter contact wheel, the manufacturer reports. Belts from 52" to 90" in length can be used. Belt width can be from 1" to 2½". Belt guard and dust scoop with exhaust outlet come with the head.

Illustrated is the Model 3-ROL polishing lathe with UP-2 belt head in vertical position (horizontal in phantom).

Hammond Machinery Builders Inc., 1600 Douglas Ave., Kalamazoo, Mich.

Use postpaid card. Circle No. 36

Screen Separating Machine Has Variable Speed Drive



The Model SS-3 screen separator features a variable speed drive and adjustable loading angle, as well as a complete selection of interchangeable mesh 24" x 48" square screens. Movement of the screen can be adjusted from 0 to 2", with reciprocations variable from 185 to 450 per minute.

The heavy-duty machine is suitable for all kinds of tumbling media and large or small parts.

Two models are available: The SS-3L offers straight through front-to-back operation; SS-3S has front loading and front discharge for small-space installations.

Rampe Manufacturing Co., 14915 Woodworth Ave., Cleveland 10, Ohio.

Use postpaid card. Circle No. 37

Magnetic separators boost wheel life, improve finishes on centerless grinders

Lower cost, greater convenience, and higher work quality — these sum up the advantages of Sundstrand Magnetic Coolant Separators serving a battery of centerless grinders in a West Coast plant. These Sundstrand separators are installed readily on existing machinery, usually on top of the coolant tank without requiring external piping or special wiring. This means installation costs are kept low and additional floor space is not required.

Magnetized drum of the Sundstrand separator removes ferrous particles as it rotates against the flow of coolant. Separated material, removed from the drum by a scraper drops into a readily removable sludge pan.

Longer wheel life provides the biggest single saving on this installation. Coolant need be changed only once a week now instead of daily as in the past.

FOUR CAPACITIES AVAILABLE Sundstrand Magnetic Coolant Separators are available in 25, 50, 75, and 100 gpm capacities to handle a broad range of machine sizes and either one or more machines.

More data on the complete line of Sundstrand Magnetic Coolant Separators is available in Bulletin A-351. Write for your copy today.

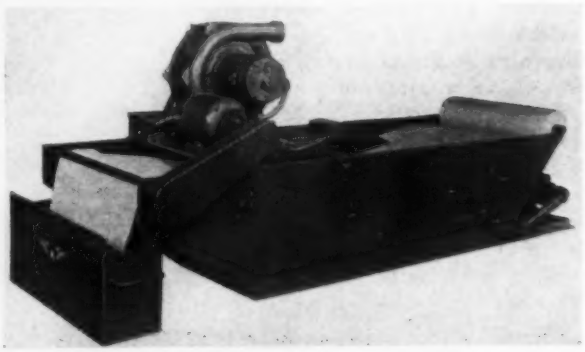
SUNDSTRAND POWER-CHIEF

SUNDSTRAND-American BROACH
DIVISION OF SUNDSTRAND MACHINE TOOL CO.
ANN ARBOR, MICHIGAN

Use postpaid card. Circle No 237

Continuous Filtration Provided for Machine Tools

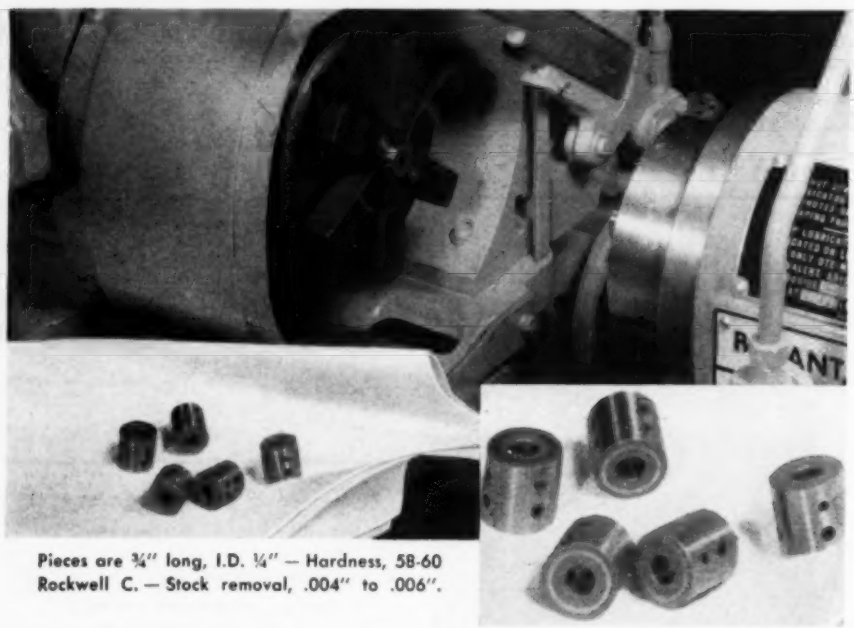
The Hoffman Vacu-Matic filters employ a new vacuum method to provide unusually high flow rates in continuous filtration of machine tool water soluble oil coolants, the manufacturer reports. Automatic and self-cleaning, the filter is said to make high speeds, faster feeds, better finishes possible as it removes all chips abrasives, dirt and other solid contaminants with minimum coolant loss and reduced shut-down.



A four times greater cake is reported to be produced than that obtained by conventional gravity flow through the paper, with a resulting savings in filter paper costs. Savings on grinding wheels, cutting tools, honing stones, broaches and other individual machine tools are reported also.

U.S. Hoffman Machinery Corp., Dept. LR, Thompson Road Plant No. 1, Syracuse, N.Y.

Use postpaid card. Circle No. 38



Pieces are ¾" long, I.D. ¼" — Hardness, 58-60 Rockwell C. — Stock removal, .004" to .006".

Internal finish of 1 to 2 micro-inches, parallelism and roundness to within ± .000010" . . . produced by Bryant Chucking Grinder Co. with **W&B GRINDING CONCENTRATE 1500**

Bryant tested many coolants, wheels and spindle speeds in readying an internal grinder for exacting work on these parts at Hughes Aircraft Co., Tucson, Ariz. White & Bagley's Grinding Concentrate 1500 did the job best . . . with a Norton 32A80MVBEM Abrasive Wheel, turning at 80,000 RPM. The job was so exacting the W&B 1500 was sent along with the machine.

W&B "1500" will help you too, in jobs as tricky as this or in routine production . . . yet costs as little as 1¢ per gallon of coolant! The foamless, transparent mix keeps wheels open, settles chips fast and provides excellent rust-protection. Send for complete information on amazing W&B "1500".

W+B INDUSTRIAL LUBRICANTS

THE WHITE & BAGLEY CO.

Worcester, Massachusetts · Detroit, Michigan

Originators of Grinding Lubricants

Sulphurized Fatty Bases
Grinding Coolants and Lubricants
Cutting, Grinding and Honing Oils
Forging Compounds

THE WHITE & BAGLEY CO., 88 Foster St., Worcester, Mass.
Please send me complete information on W&B Grinding Concentrate 1500.

NAME ..... TITLE .....

COMPANY ..... STREET .....

CITY ..... STATE .....

☐ Attached letter describes particular problem on which we'd like advice.

Use postpaid card. Circle No. 238

Position Production Tables

A two way production table with plain air feed in both directions and a longitudinal 12" maximum stroke is illustrated. This Model No. 1 has no cross feed. It is equipped with hand control valve, cylinder, and flow control.

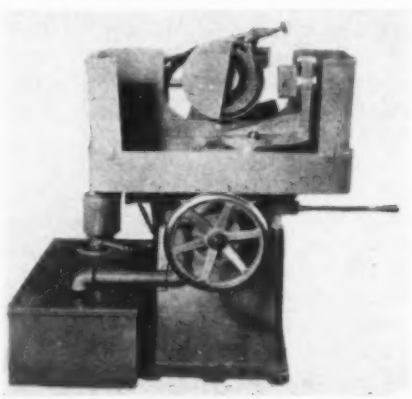
The manufacturer has two other models available also. The Model No. 2 production and layout table has air feed in both directions, a maximum longitudinal 12" stroke, and a hand wheel cross feed 2". It is equipped with hand control valve, cylinder, and flow control. Drilling and layout table, Model No. 3, features hand feed screws in both directions, and longitudinal and cross feed.

Rotex Punch Co., Inc., 2350 Alvarado St., San Leandro, Calif.

Use postpaid card. Circle No. 39

Heavy Duty Tool Grinders

The spindle of the Kempsmith heavy duty production tool grinder is driven by a 3 hp motor (located in the base of the machine) via a V-belt drive.



The wheel mount end of the spindle is massively designed to furnish rigid support to the grinding wheel. Inex-

pensive metal backed cup wheels are used. The double swivel right angle holder, mounted on a cradle which pivots on a large steel guide, permits grinding at all angles. A complete coolant system is provided, as are adequate guards. The electrics are to NMTBA standards with JIC electrics available at an additional charge.

For reasons of economy, the cradle is arranged for hand rocking. Rocking by power is, however, available at slightly additional cost. With minor modifications, this machine can be used for production face-milling of small non-ferrous metal parts.

An automobile engine manufacturer, who operated large batteries of turning equipment, reported these grinders solved his tool bit grinding problem by regularly grinding from 1300 to 1500 tool bits per day. This was accomplished by relatively low skilled operators on two grinders. The tool bits ranged in sizes from $\frac{3}{8}$ x $\frac{3}{4}$" to 1 x 2" and the stock removed varied from $\frac{1}{8}$" to $\frac{5}{8}$".

The Kempsmith Machine Co., Milwaukee 14, Wis.

Use postpaid card. Circle No. 40

Dial Comparator Features Reading in 0.00005"

A new Kwik-Chek instrument is a precision dial comparator which features direct reading in 0.00005", range of 0.004", and dual gaging contact pressure and fine adjustment on both stand and gage.

The stand has a vertical range of 4" and fine adjustment for accurate setting. It is 8.5" high, weighs 20 lbs. The gage is reported to have a negligible incremental and accumulated error, with tests proving it reliable and sturdy. Price of stand and gage is $110.

Two other current additions to the Kwik-Chek line are a dial comparator (without fine adjustment) and a micro dial indicator gage.

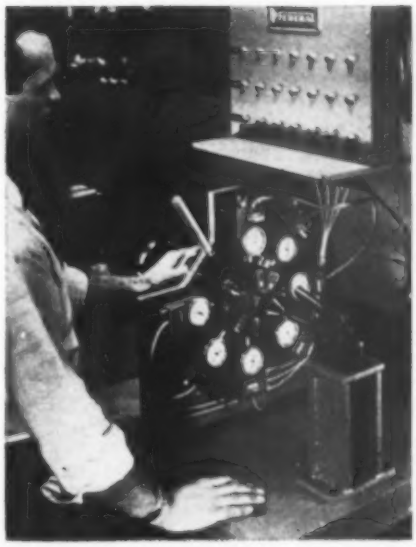
Hamilton Watch Co., Lancaster, Pa.

Use postpaid card. Circle No 41

7 Cams Simultaneously Checked by Electric Gage

Groups of seven different cams, arranged in stacks, are checked for contour, proper stacking, and broken or chipped edges on a semi-automatic electric gage.

A master cam stack is permanently fixed on a precision locating shaft. The stack to be checked is positioned precisely on the same shaft and held tightly in place by a pressure plate. Reference contacts ride the contours of each of the seven cams in the master stack. The sensitive gaging contacts which check the workpieces are coupled to the reference contacts by means of pantographs and follow them exactly as the shaft is rotated. Electrified dial indicator gaging units, called Electricators, contact the pantographs and any difference between a reference contact and its sensitive counterpart causes the Electricator spindle to move.



The inspector rotates the hand wheel one full turn to check the leading edge of the cams. He then changes the position of the cam stack by means of another wheel and checks the trailing edges.

Tough Grinding Wheel Forms Dressed Easy as A, B, C

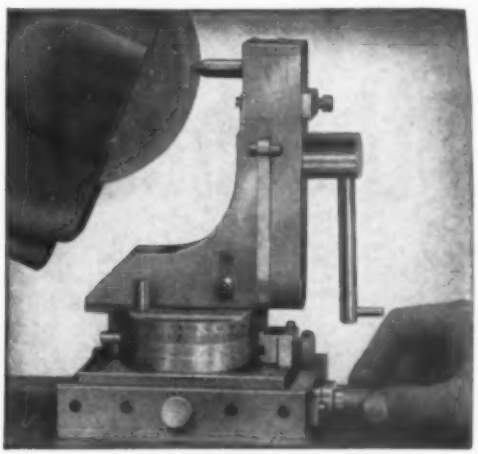
eliminate elaborate set-ups and operations

.0001" ACCURACY

Fluidmotion

WHEEL DRESSERS

dress two angles tangent to a radius in one continuous motion



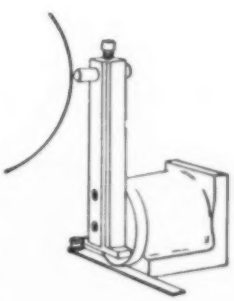
With the unique "Fluidmotion" Dresser, you can dress two angles tangent to a radius — using one handle in one continuous motion. Operation is so fast and simple that beginners can use them.

Adaptable to all type cylindrical and surface grinders.

A. Obtain micrometer reading; add required convex radius or subtract required concave radius.

B. Loosen jib with wrench and "mike" over lower pins to reading obtained above.

C. Tighten jib. Set stops for two angles. Ready for action.



Also available: "FORM MASTER" Dresser, capable of dressing any radii up to 12" convex, up to 15" concave.

See your industrial distributor or write for free literature.

J&S TOOL CO. INC — CLAMPCUT

J & S TOOL CO., INC.

880 DORSA AVE.
LIVINGSTON, NEW JERSEY

Use postpaid card. Circle No. 239

The spindles actuate switching contacts which control signal lights. By glancing at the bank of lights mounted above the gaging station, the inspector can quickly ascertain the acceptability of the entire stack of cams.

The gage solves a problem more involved than most because seven cams must be checked simultaneously and not only must the inspector know that the contours are correct and the edges unchipped, but he must also know whether or not the cams are stacked in the proper order. The semi-automatic gage is said to give a definite, unbiased answer to all these questions in a short time and is not subject to fatigue and boredom, so that it can be depended upon to inspect the last piece of the day just as accurately and just as thoroughly as the first.

Federal Products Corp., 1144 Eddy St., Providence, R.I.

Use postpaid card. Circle No. 42

Turbine Grinder for Tool and Die Finishing

A single-stage high speed turbine grinder, known as the "imp" Model 7979, is reported to do any kind of grinding or cutting where ⅛"-shank mounted wheels or cutters can be used.

The 4½" long, 7-oz. tool grinds, deburrs, cuts, and polishes. It delivers 75,000 rpm at normal 90-lb. airline pressure. The tool is priced at $49.50.

A straight-through flow of air is permitted with exhaust air discharged at the spindle end of the tool. This air system blows chips and particles away from the work.

The twist type throttle delivers maximum air, and will also hold any desired setting below maximum speed. It is recommended that the grinder be installed with an airline filter only, so that moisture may be removed from the air system.

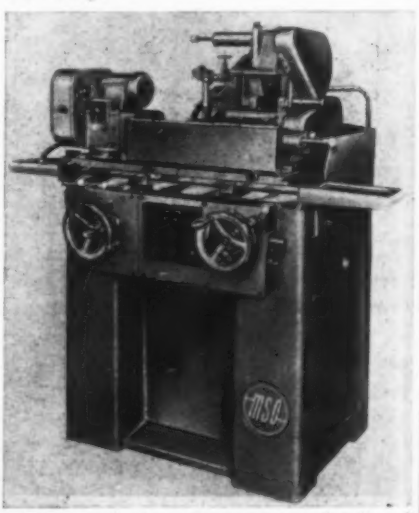
The grinder is also available in a handy kit with the following equipment: single-stage turbine grinder, 7' air hose with cartridge filter, collet wrench, dressing stone, and four mounted grinding wheels.

The Aro Equipment Corp., Bryan, Ohio.

Use postpaid card. Circle No. 43

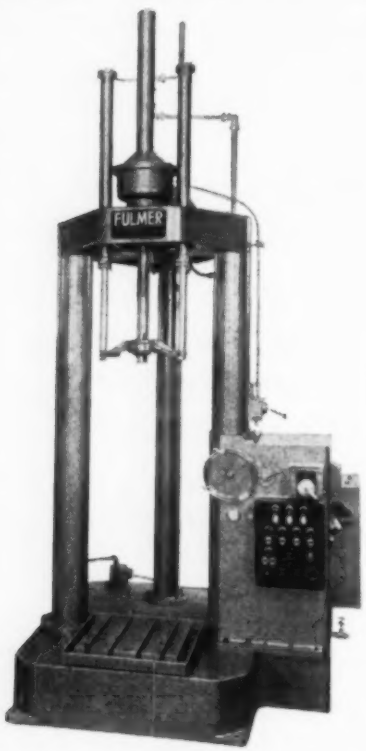
7" x 12" Universal Grinder

Introduction of the MSO Model FMES 7" x 12" universal grinder is announced by Austin Industrial Corp., U.S. distributors for MSO Works, West Germany.



The grinder features: wheelhead mounted on compound swivel base for grinding; 90° swiveling workhead for face grinding; live and dead center work spindle; dual speed hand table traverse for shoulder grinding; power table traverse (three speeds); manual and automatic wheelhead infeed; fine infeed to .00004" on work diameter;

Why does the best ...cost less?



Honing machines, unlike most machine tools, do not require massive weight and rigidity to maintain accuracy. Fulmer designers recognize this basic concept by "beefing up" their machines only where it counts . . . with heavy-duty oversize spindles, bearings and gear train . . . the vital working parts. Functionally designed Fulmer Honing Machines save you money by eliminating needless masses of high-priced cast iron and steel . . . they weigh less, cost less.

Fulmer machines combine simplicity with flexibility, quality with economy. All this and never a charge for service!

Get the Best and Pay Less—Call Fulmer

C. ALLEN FULMER CO.
Dept. 29-C 107 E. Fourth St.
Cincinnati 2, Ohio MAin 1-4683

FULMER
WORLD'S BEST
Honing Machines

Use postpaid card. Circle No. 240

table swivels 10° in or out; hinged internal grinding attachment; patented adjustable spindle bearings, force feed lubricated; vibration-free gearless drive from dynamically balanced motors.

The model is also available with hand table traverse and manual wheelhead infeed only.

Austin Industrial Corp., P.O. Box 430, White Plains, N.Y.

Use postpaid card. Circle No. 44

Microhardness Tester

A Microhardness Tester which permits direct, accurate readings, corresponding to Vickers, within 15 sec. by measuring resistance hydrostatically, and which eliminates a microscope, conversion charts and complicated tables is now available. Small precision parts, such as small wire, tips of cutting tools, surgical needles etc. can now be tested. Slight vibrations do not affect the instrument.

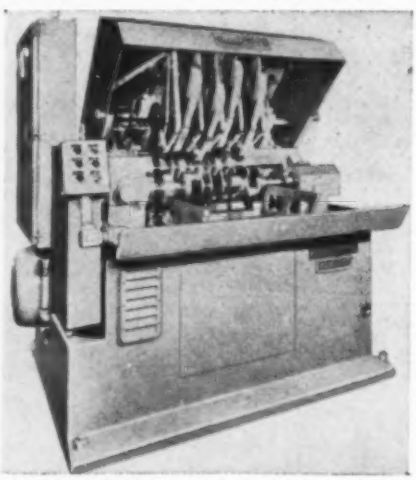
Tester is illustrated with the large dial shown, which is said to be easily read to facilitate comparative readings which correspond to Vickers 100 to 1000 (equal to hardnesses ranging from Rockwell B64 to C70 or Knoop 500G, 117-94). The unit can be obtained in 1 kg or 2 kg loads, penetrating as little as .000079" or .00016", respectively.

Newage Industries, Inc., 222 York Rd., Jenkintown, Pa.

Use postpaid card. Circle No. 45

Manually Loaded Unit for Lapping or Fillet Rolling

The Footburt-Schraner Model SF is a manually loaded machine for lapping or roll burnishing bearing surfaces on



straight shafts, crankshafts, or camshafts, or for fillet rolling stress-concentration points in shafts. The model will handle shafts up to 36" long and up to 5" stroke. Any shaft with bearing surfaces ½" wide or more and with at least 1¾" between centers of bearing surfaces can be accommodated.

Coated-abrasive cloth is used. In production the unit will provide a five to seven micro-inch finish when following a finish grind or precision turning operation that has left a 40 micro-inch or finer finish. The Footburt-Schraner lapping process is about twice as fast as honing and is both faster and less expensive than precision grinding, the manufacturer reports. In addition, the model can lap bearing surfaces and fillets in one operation.

This model is heavier and faster than its predecessor, the Model B. The lapping heads have been completely redesigned and equipped with anti-friction bearings to accept heavier loads from burnishing. The headstock is completely new also. No master crank is needed for lapping or roll burnishing crankshafts or camshafts—the heads automatically follow eccentric bearing surfaces.

The lapping, roll burnishing, and fillet rolling machine can be provided with one to sixteen heads. The hydraulic system can be either integral or separate. The 10 hp drive motor is fitted with an electric clutch and brake. Floor space required is 66" x 84"; height is 62"; net weight approx. 6500 lbs.

Schraner Div., The Foote-Burt Co., Cleveland 8, Ohio.

Use postpaid card. Circle No. 46

WITH BETTER PROFITS KRAMER FINISHING EQUIPMENT

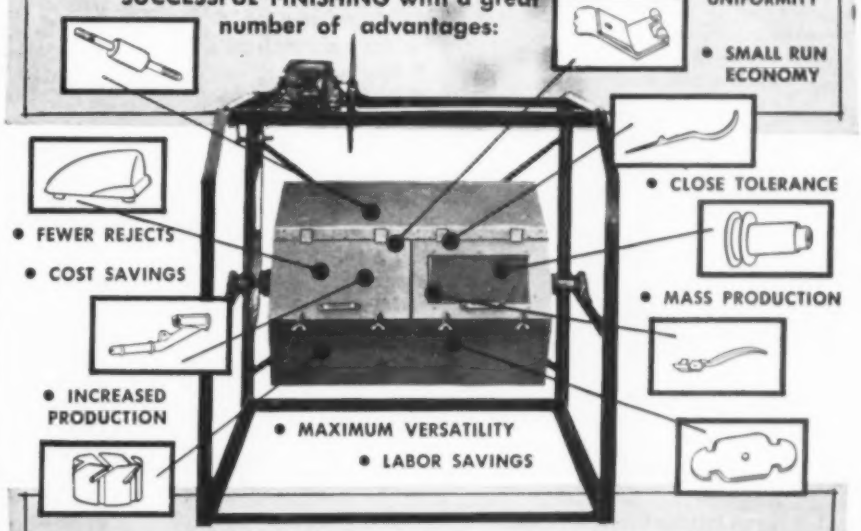
Development of New Methods Cuts Costs!

The greatest money-saving opportunities in Metal Finishing is yours now . . . in the use of H. W. KRAMER barrel Finishing!

Now, you can finish parts by the hundreds instead of the conventional methods that finish 1 part at the time. It's real easy work . . . it's childs play!

SAMPLE PARTS PROCESSED and a SPECIFICATION SHEET SUPPLIED TO THE MANUFACTURER.

Only Kramer's Tumblers & Buffers give you SUCCESSFUL FINISHING with a great number of advantages:



H. W. KRAMER solves any of your FINISHING PROBLEMS. Guaranteed prompt assistance in solving and determining the proper finishing procedure.

Write Dept. 76 for Free Literature.

H. W. Kramer
120-30 JAMAICA AVENUE, RICHMOND HILL, N. Y.

NEW ENGLAND REPRESENTATIVE
Russel E. Smith
98 Green Hill Road
P.O. Box #345
Westwood, Mass.

FLORIDA REPRESENTATIVE
Ace Plastic Materials
5541 NW 37th Avenue
Miami, Fla.

Use postpaid card. Circle No. 241

MICROBEADS GLAS-SHOT®

can help you achieve better results from your blast equipment

Microbeads Glas-shot are microscopic glass beads for use with all types of wet or dry blast equipment. Uniformly spherical in shape, Microbeads Glas-shot withstands the rigors of blasting and resists shattering.

Glas-shot are available in a wide range of mesh sizes for cleaning, polishing, peening or finishing any material normally processed with blast equipment. Because they have an extremely low metal removal rate, excellent results may be achieved where close tolerances must be held.

Microbeads Glas-shot possess a number of advantages unavailable in any other abrasive. Why not investigate their possibilities.

FOR COMPLETE INFORMATION AND SAMPLES . . . JUST MAIL THE COUPON BELOW

Microscopic Glass Beads for Industrial and Reflective Purposes

MICROBEADS INC.
P.O. BOX 241
JACKSON, MISSISSIPPI

☐ **Send information and samples**

☐ **Have representative call**

Name

Title

Firm

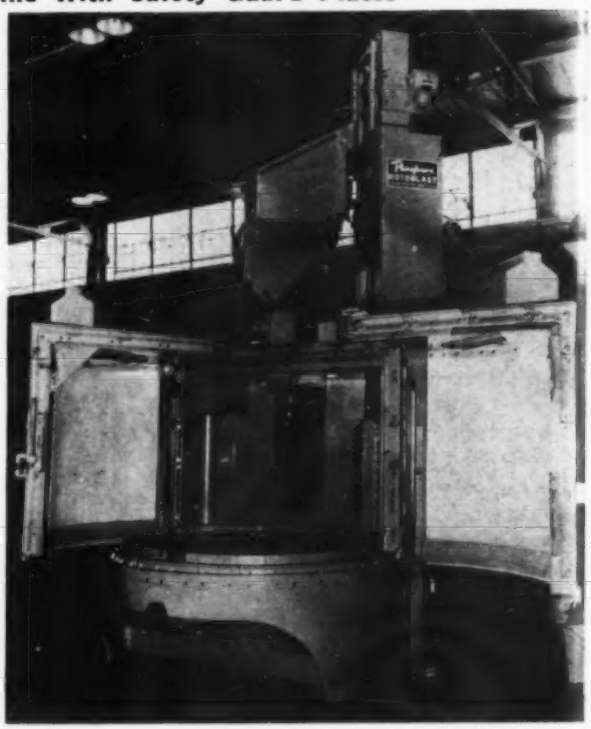
Street

City Zone State

BL-259

Use postpaid card. Circle No. 242

Blast Cleaning Machine With Safety Guard Plates



The 6′ Rotoblast Table-Room is said to be capable of Rotoblasting castings, forgings, and stampings up to 72″ in diameter by 36″ high, and weighing up to 5000 lb. The table is equipped with a cast labyrinth abrasive sealing system which makes the cabinet abrasive tight without rubber gaskets.

A single overhead Rotoblast wheel, powered by a 30 hp motor, will throw 50,000 lbs. of abrasive per hour, the manufacturer reports.

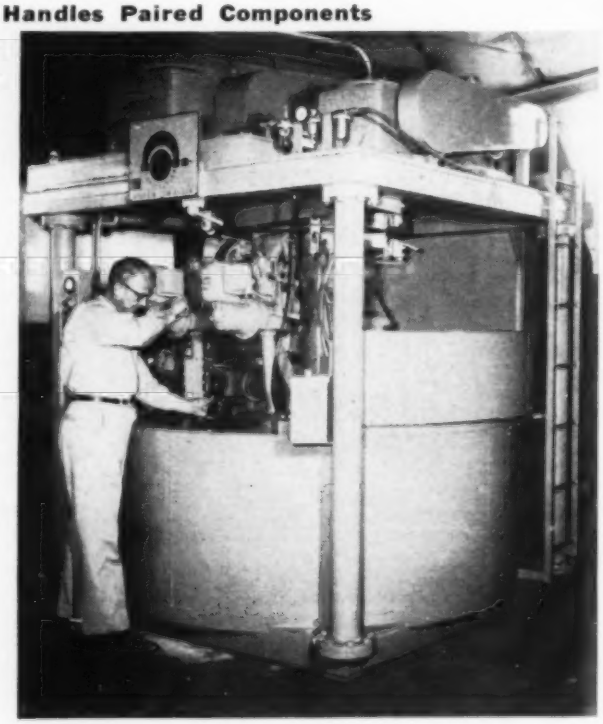
A new safety feature is power operated guard plates positioned in front of the wheel when the motor is turned off to prevent abrasive from striking the table. When the abrasive wheel is turned on again, the guard plates retract to the original position. In addition, a safety switch automatically turns off the Rotoblast motor and these plates go into position in front of the wheels when the doors of the unit are opened.

For maximum abrasive efficiency, a new self-contained automatic elevator and extra large capacity pneumatic separator continuously clean used abrasive for recirculation to the wheel.

Pangborn Corp., Hagerstown, Md.

Use postpaid card. Circle No. 47

Deburring Machine Handles Paired Components



The MM-4-8 Mecha-matic machine, designed for a multiplicity of parts, handles paired components which must be deburred and remain together, such as connecting rods and caps. The parts are mounted on air operated spindle fixtures which are submerged, while rotating, in a fluid abrasive mass which simulates a form fitting grinding wheel, regardless of the shape of the piece part, and travels at the rate of 300 to 600 sfm.

At a one-minute time cycle, 480 pieces per hour are said to be produced.

High-speed Mecha-matic machines are also built for smaller components where the time cycles vary from three to six seconds.

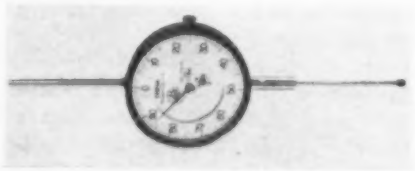
Mecha-Finish Corp., Sturgis, Mich.

Use postpaid card. Circle No. 48

3″ Range Indicator

Specially designed for use in measuring slide travel, cam throw, etc., the Model E81U dial indicator has a total range of 3″ and is graduated in .001″. Increased length of stem, spindle and dust cap allows for a much greater distance of spindle travel.

To enable quick reading anywhere in the total span of thirty revolutions, the indicator is equipped with two counter dials. One dial is divided into ten segments of .100" each to count individual revolutions; the other is divided in inches.



The indicator is furnished with a vertical central bracket back and continuous clockwise dial. However, it can be used with a number of other readily available backs and contacts.

Federal Products Corp., 1144 Eddy St., Providence 1, R.I.

Use postpaid card. Circle No. 49

Safety Glasses

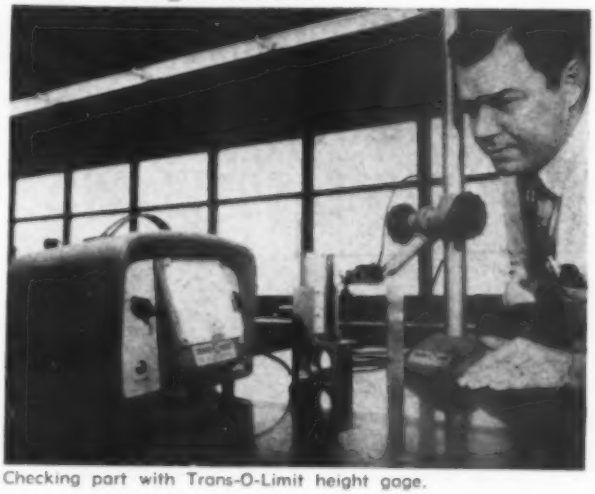
The C-20 glasses have been designed to combine long-wearing comfort and good looks with the protection of safety glasses. The plastic and metal frame (with top rims and temples in dark brown) has been designed so that there is nothing to break, shrink or warp, the manufacturer claims.

Where glare protection is necessary, the glasses are available for Ray-Ban green lenses in two different shades. Redy-Fit side shields can be easily attached for side protection.

Safety Products Dept., Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N.Y.

Use postpaid card. Circle No. 51

Transistorized Gages Offer 4 Magnifications



Checking part with Trans-O-Limit height gage.

The portable lightweight Trans-O-Limit gages feature completely transistorized circuits and four separate magnifications. These four magnifications can instantly be selected by flicking a switch. Measuring optionally in thousandths, ten-thousandths, or millionths, the gages are said to provide the widest total measurement range ever offered.

The gaging circuit operates at 500 cps, which reportedly permits greater miniaturization of several of the important components. As a result, gaging pressure will not distort extremely small and delicate workpieces or mar highly finished surfaces, the manufacturer claims.

The line consists of a cabinet containing power unit and indicating meter, which can be used with the Trans-O-Limit height gage, external comparators, snap gages or the cartridge units.

The Pratt & Whitney Co., Inc., Charter Oak Blvd., West Hartford 1, Conn.

Use postpaid card. Circle No. 50

"We Cut Form Grinding

COMPLEX GRINDING WHEEL FORMS ARE PRODUCED IN MINUTES *... by simply traversing the tracer lightly over an easily made template. A 10-to-1 ratio between template and truing diamond insures work accurate to "tenths."*

WRITE NOW FOR FREE PRODUCT LITERATURE ... and see for yourself how a P&W Diaform Attachment can bring new speed, precision and economy to your form grinding operations. Just fill in and mail the handy coupon.

Time OVER 33% . . .

Using P&W Diaform Wheel Forming Attachments," says The B. JAHN Company.

Using Pratt & Whitney Diaform Wheel Forming Attachments, the B. Jahn Company, Inc. of New Britain, Conn. now form-trues grinding wheels—accurate to .0002" or better—*in minutes!* As a result, average time for producing the high-precision contoured punches and dies, which this company supplies to the aviation industry, has been cut 33%. Costs have been cut proportionately and busy machines released for other work. B. Jahn also likes the Diaform's *portability*, light weight, low initial cost and easy operation. As B. Jahn's chief engineer states, "We can take a man—and don't have to take our most experienced man—and in no time at all have him turning out precision work that is *better* than the old timers could *ever* do by other grinding methods."

PRATT & WHITNEY COMPANY
INCORPORATED
6 Charter Oak Boulevard, West Hartford 1, Connecticut

Please send my free copy of P&W Diaform Circular No. 543-3.

NAME _____ POSITION _____

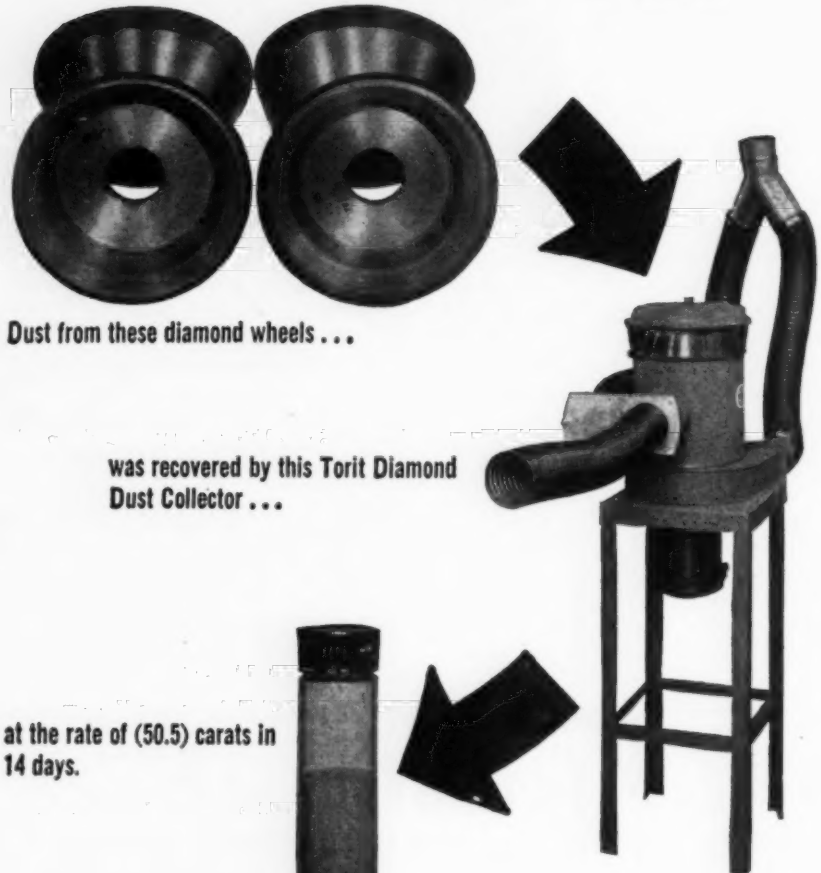
COMPANY _____

CO. ADDRESS _____

CITY _____ ZONE ___ STATE _____

Use postpaid card. Circle No. 243

NEW TORIT DIAMOND DUST COLLECTOR SAVES YOU UP TO 30% OF CARAT USAGE; COSTS ONLY $178.50!



Dust from these diamond wheels . . .

was recovered by this Torit Diamond Dust Collector . . .

at the rate of (50.5) carats in 14 days.

exclusive new centrifugal design simplifies recovery, serves all diamond grinding operations

Actually pays for itself in days. In an on-the-job test of this new TORIT equipment, the initial investment was returned in just 21 operating days. The test was conducted by a leading automobile manufacturer under regular operating conditions. Recovery averaged 30% of the carats originally contained in the diamond grinding wheels. You actually get a cash return of $1.00 for every $10.00 invested in diamond grinding wheels.

For all diamond grinding operations. This new TORIT Collector provides the same outstanding performance in all types of grinding operations—mist, wick or dry. Its design and operational simplicity also mean virtually maintenance-free service. Its tough construction assures long, long life.

Installs anywhere. TORIT'S new Diamond Dust Collector can be used alone or in conjunction with central exhaust systems or unit dust collectors. It weighs only 65 lbs. and requires only 14" x 22" floor space. Its centrifugal separating action uses no filters or sloppy, inflammable oil baths. Service is quickly and conveniently performed by simply unscrewing the unit's top for removal and emptying of the clear plastic container.

FREE details and full specifications on request. Here's your chance to really save on your diamond usage. Write today for full information on this important new diamond grinding development.

TORIT MANUFACTURING COMPANY Walnut & Exchange Sts., Dept. 510, St. Paul, Minnesota

Use postpaid card. Circle No. 244

Rapid Cutting Barrel Finishing Media

Three major barrel finishing problems — discoloration, impingement and media fracture—are said to be almost eliminated with a new shaped media, the Honite brand C-R tumbling shape. It is a truncated triangular pyramid with sharp edges and acute angles that reportedly work into radii not reached by other types of media.

The cutting speed of the new shape—composed of aluminum oxide mineral anchored in a 3M-developed binder—is up to two and one-half times faster than existing aluminum oxide chips, and as much as twelve times faster than natural stone media, the 3M company claims. Because of its speed and concentrated cutting action, the media is specifically intended for stock removal.

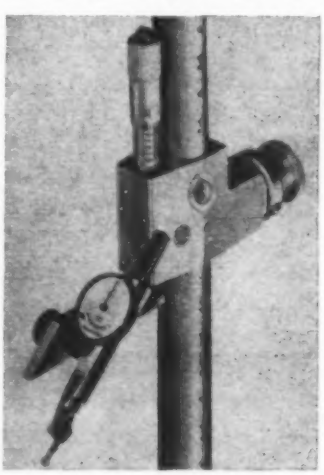
The tumbling shapes will be available in several sizes.

Minnesota Mining and Manufacturing Co., Dept. F9-32, 900 Bush Ave., St. Paul 6, Minn.

Use postpaid card. Circle No. 52

Dial Indicator Increases Accuracy of Height Gages

The accuracy of the easy-to-read Microball micrometer height gages has been reportedly increased by the use of a new dial indicator comparator gage in conjunction with a built-in micrometer. By manipulating the height



gage micrometer thimble to offset deviations shown on the dial indicator, 90% of the error inherent to dial indicators is said to be eliminated. This provides for more accurate readings on micrometer than were previously possible, the manufacturer claims.

The rigid height gages are obtainable in 12" and 24" heights.

Foster Supplies Co., 6122 Milwaukee Ave., Chicago 46, Ill.

Use postpaid card. Circle No. 53

News from the Industry

Dual Automated Barrels Cut Master Electric's Labor Costs 50%

Automation of blast cleaning gray iron castings at Master Electric Co., division Reliance Electric & Engineering Co. of Dayton, Ohio, has reduced costs by 50%. Where previously six men were required to handle gating and barrel loading, now three men handle the barrels, handle gating and stacking during the cleaning operation. This labor saving is reported as amounting to $300 a week or $15,000 a year direct savings in man-power alone.

Two 12 GN Rotoblast barrels clean 33 tons of gray iron castings per day.

Master Electric pours about 50 tons of gray iron castings a day and approximately 33 tons are cleaned in two Rotoblast barrels. A few pieces not suited to tumbling action are cleaned on a blast table. Typical castings cleaned for the ⅛ to 400 hp motors, manufactured by Master, are motor end bells, motor frames, bearing housings and gear cases.

Manpower is required only for loading and pushing the buttons that start the entire automatic cycle on the 12' Rotoblast barrels manufactured by the Pangborn Corp. of Hagerstown, Md.

American Buff Builds Facer-Trimmer Machine

An important element in the development program of American Buff Co. of Chicago is the Research and Engineering Department which has to its credit the creation of many new buff designs and improvements serving the metal finishing industry.

Research specialists there have shown that a single ounce inbalance on a 14" buff running at 1800 rpm exerts 40 extra pounds of centrifugal force. To produce positive accuracy and balance in its buffs for use in high-speed metal-finishing operations, the firm has designed and built its own precision facer-trimmer machine.

In order to assure a perfectly concentric face on any type of buff, the buff is revolved at speed approximating the rpm at which it will be used in actual finishing operations. At this speed, it is faced off by the trimmer-facer unit, which produces an absolutely true diameter in perfect relation to the arbor.

Sellstrom Mfg. Expands Prescription Glasses Lab

To meet the increasing demand for industrial prescription safety glasses, Sellstrom Manufacturing Co. of Palatine, Ill., has expanded its prescription laboratory facilities. The new service would be devoted exclusively to making tempered resistant safety glasses ground to individual prescription.

Complete with precision grinding equipment and other machines, the enlarged Sellstrom facilities are fully staffed with skilled grinding experts.

Those desiring additional information or advice on prescription safety glasses should write to the Prescription Safety Glass Laboratory, Sellstrom Manufacturing Co., Palatine, Ill.

Thomas C. Wilson, Inc. Adds Pneumatic Grinders

A new line of portable pneumatic grinders was launched by Thomas C. Wilson, Inc. of Long Island City, New York, at the ASME Power and Mechanical Engineering Exposition, New York Coliseum, December 1-5. The new grinders are the latest addition to the firm's portable air-driven equipment. Both powerful horizontal grinders and high-speed die grinders are included in the new line.

Here members of the Wilson staff examine new die grinders: Left to right, **A. John,** Assistant General Manager; **H. Steffens;** and **R. Curran.**

Commercial Standard For Grading Abrasive Grain

Producers, distributors, and others associated with the Abrasive Materials Industry are considering a recommended Commercial Standard designed to provide nationally recognized test methods for most coated abrasive products, according to the Commodity Standards Division, U.S. Department of Commerce.

The Standard will serve as a medium for establishing the grading limits of the mineral grit sizes used in the production of coated abrasive sheets, belts, discs, rolls, and similar products. In addition, it will provide uniform recovery procedure and test methods for determining conformity of the grain on the finished product with the grading limits set by the standard.

A limited number of copies of the **Recommended Commercial Standard for Grading of Abrasive Grain on Coated Abrasive Products** are available without cost from Wm. H. Furcolow, Commodity Standards Div., U.S. Department of Commerce, Washington 25, D.C.

Armour Combines Operations

Formation of the Armour Alliance Industries by combining the Coated Abrasives, Cushioning Products and Adhesives operations of Armour and Co., is announced by F. B. Patton, Vice-President. Headquarters of the new organization will be at Alliance, Ohio.

Carl B. Johnson is named General Manager, succeeding R. L. Reeves, who resigned. R. W. Gutheil, formerly General Manager of the Adhesives Division, is appointed Marketing Director of Armour Alliance Industries, a newly created position.

Norton Co. Demonstrates Abrasive Products at Show

Norton Co. of Worcester, Mass. will feature and demonstrate reinforced resinoid abrasive products for use on portable machines in Booth 744 at the Western Metal Exposition, March 16-20 in Los Angeles. Also featured will be grinding wheels for toolroom, surface, centerless and internal grinding machines, and tumbling abrasive for barrel finishing.

Norton representatives who will be present during the show are Robert Cushman, Sales Manager of Grinding Wheels; W. Alex McCune, Manager of Field Sales, Grinding Wheels; Harry G. Brustlin, Manager of Marketing Services; Sidney B. Wetherhead, West Coast District Manager.

Techline Opens New Chemistry Laboratory

Techline Division of Wheelabrator Corp. of Vicksburg, Mich. has opened a new chemical laboratory in conjunction with the processing laboratory at the Vicksburg plant, with facilities for research and development in the field of barrel finishing compounds.

Mason Atkins has been named Chief Chemist at the Techline facilities. Atkins formerly served for five years as a field engineer specializing in wet blast precision finishing for Wheelabrator. Prior to this he was a research chemist for a leading pharmaceutical manufacturer, and quality control chemist for Bendix Aviation Corp.

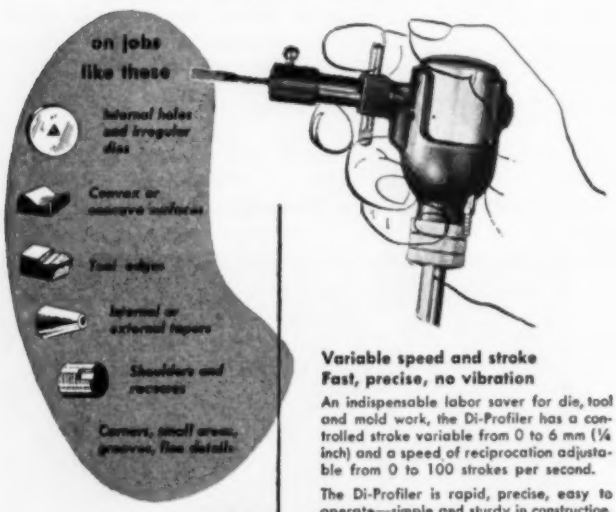
Howe & Fant Purchased By Brown & Sharpe Mfg. Co.

Brown & Sharpe Mfg. Co., 125-year-old machine tool builder of Providence, R.I., has purchased Howe & Fant, Inc., East Norwalk, Conn., originator and manufacturer of turret-drilling and jigless work-positioning devices. Howe & Fant will become a subsidiary known as the Brown & Sharpe Turret Drilling Division, Inc.

THE **Di-Profiler**

RECIPROCATING HAND MACHINE

for time-saving cutting—roughing—finishing


on jobs like these
internal holes and irregular dies
Convex or concave surfaces
Tool edges
Internal or external tapers
Shoulders and recesses
Corners, small areas, grooves, fine details

Variable speed and stroke
Fast, precise, no vibration

An indispensable labor saver for die, tool and mold work, the Di-Profiler has a controlled stroke variable from 0 to 6 mm (¼ inch) and a speed of reciprocation adjustable from 0 to 100 strokes per second.

The Di-Profiler is rapid, precise, easy to operate—simple and sturdy in construction. Its weight of less than one pound and freedom from vibration eliminate fatigue and assure perfect control for the most intricate work.

Moderately priced, the Di-Profiler pays for itself many times through time-saving cost reductions.

Tools for every type of work
CUTTERS, FILES, DISCS, POINTS, BURRS, LAPS, SCRAPERS

write for free demonstration or illustrated price list DG-39

ENGIS EQUIPMENT COMPANY
Sole Authorized Distributor for the United States
431 S. Dearborn Street, Chicago 5, Illinois

Use postpaid card. Circle No. 245

WANTED

CUSTOMERS FOR No. 400 and No. 500 ALUMINUM OXIDE POWDERS

In the manufacture of our "Micro-Graded" Aluminum Oxide Optical Powders, we accumulate large quantities of No. 400 and No. 500 Grit Precision Graded Aluminum Oxide Powders in excess of our normal requirements.

Additional outlets are required for these two grades as well as extremely fine Aluminum Oxide Powders below 5 microns in size.

If you can use any of these grades, write us at once for quotations and samples.

"MICRO-GRADED" ABRASIVES

Manufactured by

K. C. ABRASIVE COMPANY
P.O. Box 4335 3101 Peery Ave.
Kansas City 27, Missouri

A complete line of Aluminum Oxide Powders from 2 to 50 microns available. Sized to your exact requirements.

Use postpaid card. Circle No. 246

Allis-Chalmers Purchases S. Morgan Smith Co.

Purchase of S. Morgan Smith Co. by Allis-Chalmers Mfg. Co. of Milwaukee was effective January 28. The York, Pa. firm and its subsidiaries will operate as A-C's newly created Hydraulic Division within the Industries Group. **Joseph L. Singleton** is Vice-President, Industries Group. **Beauchamp E. Smith** was named General Manager of the new division.

As the Hydraulic Division, fifth area within the Industries Group, the two plants comprising the York facilities will be devoted to the continued research, design, engineering and fabrication of a complete line of hydraulic turbines and accessories, pumps and pump-turbines, valves for industrial, waterworks and power applications, and specialized heavy hydraulic equipment.

Three Assistant General Managers were named for department functions: **Burwell B. Smith** is now in charge of sales; **Duncan D. McArthur** will head the Industrial Relations, Procurement and Comptroller's Departments, and **William J. Rheingans** is in charge of engineering.

B. E. Smith

B. B. Smith

D. D. McArthur

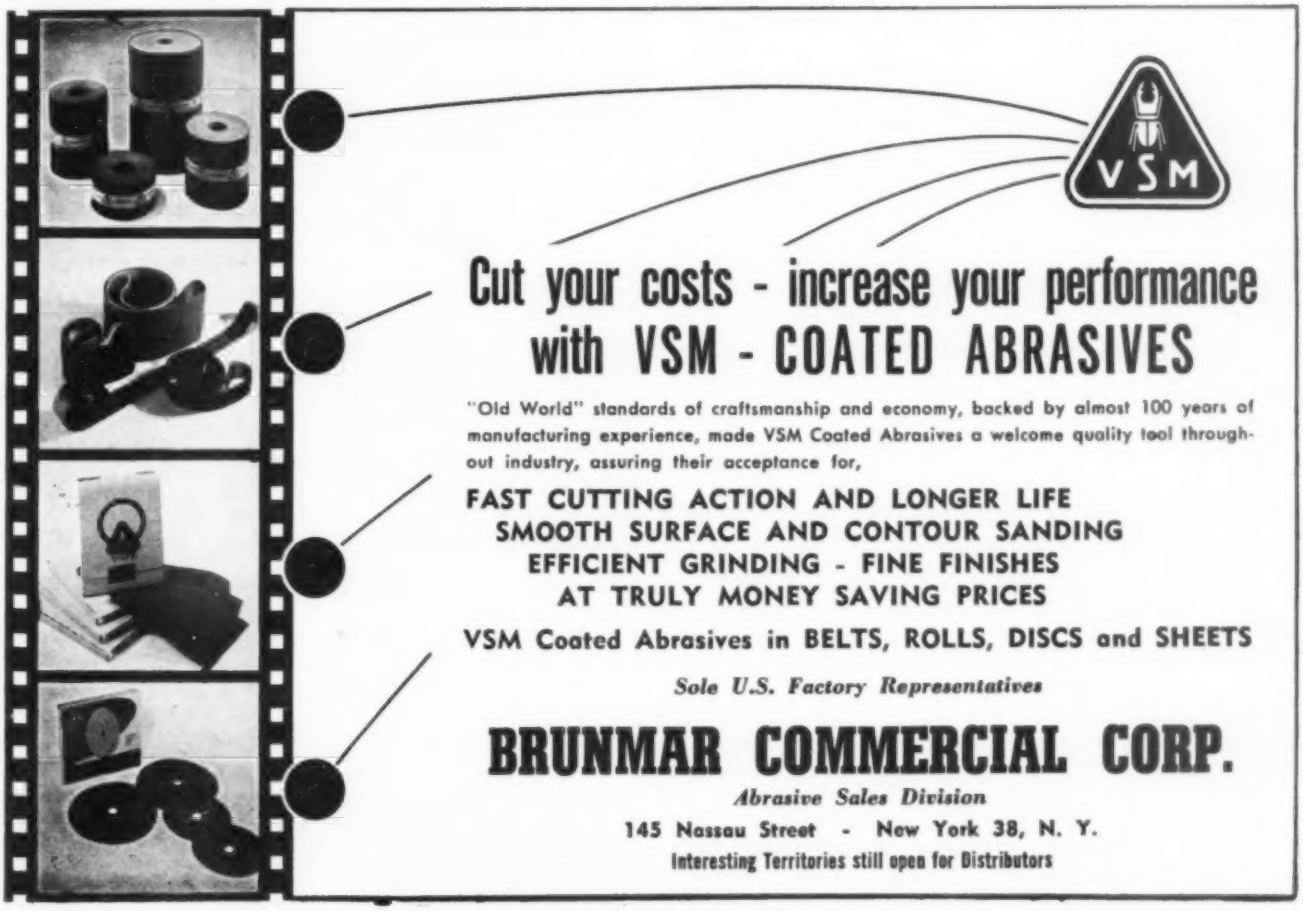
Shop assembly of a 121" diameter x 185-3/8" high x 466" long plate steel draft tube liner at Hydraulic Division's Plant 1 operations in York, Pa.

Rivett Lathe & Grinder, Inc., of Boston has appointed **Scott Equipment Co.**, 3825 Jacob St., Wheeling, W. Va., as distributor in West Virginia and Southeastern Ohio for Rivett air and hydraulic valves, cylinders and power units.

W. J. Rheingans

Stanley Berg, Inc., 1231 Banksville Rd., Pittsburgh 16, Pa., has been appointed by **Rivett Lathe & Grinder, Inc.**, of Boston, as distributor in Western Pennsylvania for Rivett air and hydraulic valves, cylinders and power units.

William R. Gallagher heads up the Fluid Power Div. of Stanley Berg, Inc., as Sales Manager, and under his direction as Sales Engineers, **L. G. Mazanowski** and **W. J. Brajdich.**


VSM
Cut your costs - increase your performance with VSM - COATED ABRASIVES
"Old World" standards of craftsmanship and economy, backed by almost 100 years of manufacturing experience, made VSM Coated Abrasives a welcome quality tool throughout industry, assuring their acceptance for,
FAST CUTTING ACTION AND LONGER LIFE
SMOOTH SURFACE AND CONTOUR SANDING
EFFICIENT GRINDING - FINE FINISHES
AT TRULY MONEY SAVING PRICES
VSM Coated Abrasives in BELTS, ROLLS, DISCS and SHEETS
Sole U.S. Factory Representatives
BRUNMAR COMMERCIAL CORP.
Abrasive Sales Division
145 Nassau Street - New York 38, N. Y.
Interesting Territories still open for Distributors

Use postpaid card. Circle No. 247

Black Rock Purchases Reed-Prentice Machines

Purchase of the entire line of Reed-Prentice lathes and millers from **Package Machinery Corp.** of East Long Meadow, Massachusetts, was announced by **The Black Rock Manufacturing Co.** of Bridgeport, Conn.

The Reed-Prentice equipment involved in this purchase includes the Model B-14" and 16" tool room lathes; Model AA-14" and 16" engine lathes; Model A-20" engine lathe; Model No. 4, No. 12V, 22V and No. 22VS vertical millers, and selected service parts to satisfy replacement requirements.

The Black Rock Manufacturing Co. has been designing and building special machinery for more than fifty years. Many Black Rock machines are used in the rubber industry for cutting, grinding, tipping, trimming and various other processing operations, and also in the small arms and ammunition industry for cutting and trimming of metal.

Carborundum to Build Plant for Research & Development

The Carborundum Co. will build a new $3¼ million pilot plant for its Research and Development Division in Niagara Falls, New York. This division is turning out new products which require ultra-high temperature processing techniques not presently available in the main operating divisions of the company. The new R&D plant will provide special equipment.

New products now produced in a smaller pilot plant, "KT" silicon carbide, "GRB" silicon carbide, and boron nitride, will be brought to full commercial status in the new pilot plant. The principal market for the products is in industries such as atomic energy, missiles, and electronics.

The pilot plant will be operated by the New Products Branch of the Research and Development Division, headed by Donald G. Sturges, Manager of the Branch.

Master-Craft Supply Co., Inc. of West Haverstraw, N.Y., are changing their company name to **Master-Craft Industries, Inc.** in order to properly reflect their diverse manufacturing activities. They are presently engaged in the manufacture of the Sootmaster vacuum cleaner and filter units, dust bags, hoses and attachments to fit all commercial vacuum cleaners. No changes in personnel have been announced.

Power Specialty Co. now represents **Indiana Commercial Filters Corp.** of Lebanon, Ind. The Houston headquarters of Power Specialty Co. is at 2000 Kipling St. The Dallas office, under the direction of **George Whittet**, is at 4512 Central Expressway.

The Diamond Dust Co., Inc., 88-19 76th Ave., Glendale 27, L. I., N.Y. announces that the firm is now seeking representatives to handle the sale of the firm's line of diamond lapping compounds and diamond powder.

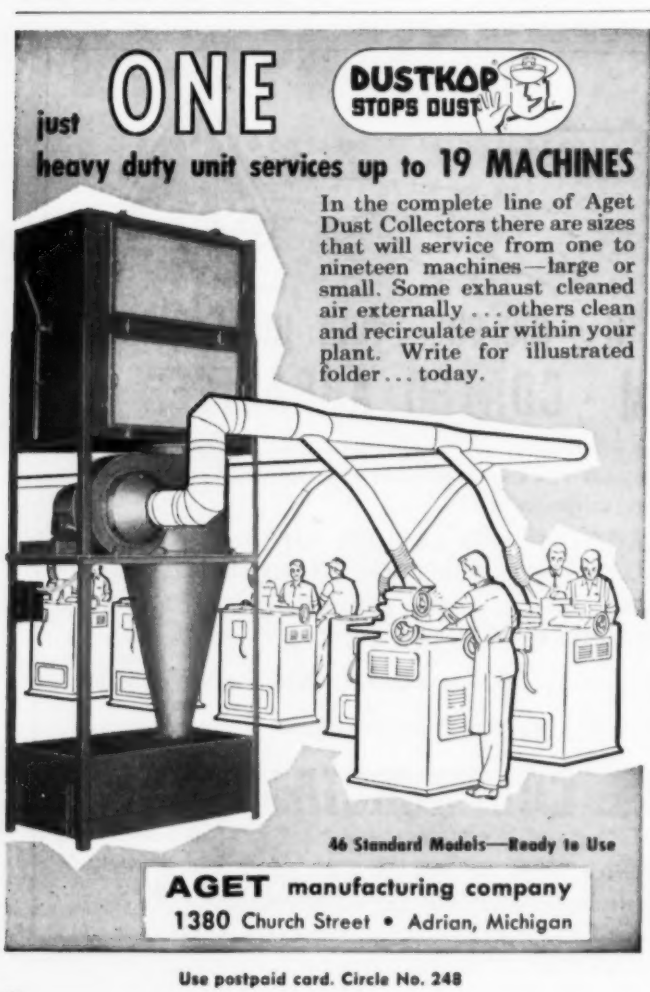
Abrasive Specialists of Milwaukee has been appointed Wisconsin distributor for the **Roto-Finish Co.** of Kalamazoo, Mich., manufacturers of barrel finishing machines, abrasive media and compounds.

Abrading Systems Co. of Skokie, Ill., manufacturers of the Speedlap machine, opened a branch plant to serve the Los Angeles area with their job lapping service. The Los Angeles office is located at 849 Mission St., South Pasadena, phone Ryan 1-2178. Inspection of the machine and facilities is invited.

just ONE DUSTKOP STOPS DUST

heavy duty unit services up to 19 MACHINES

In the complete line of Aget Dust Collectors there are sizes that will service from one to nineteen machines—large or small. Some exhaust cleaned air externally . . . others clean and recirculate air within your plant. Write for illustrated folder . . . today.



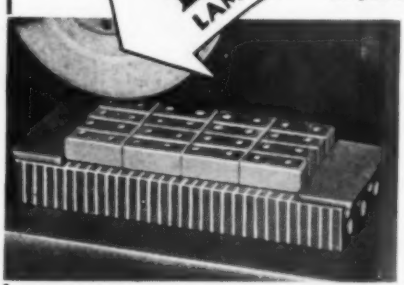
46 Standard Models—Ready to Use

AGET manufacturing company
1380 Church Street • Adrian, Michigan

Use postpaid card. Circle No. 248

SPEED SURFACE GRINDING SET-UPS WITH MAGNE-BLOX LAMINATED PARALLELS and V BLOCKS

Ideal for small pieces and any odd shapes that cannot be put directly on the surface plate.



• SAVE YOUR MAGNETIC CHUCKS
• ELIMINATE CLAMPS
• ELIMINATE HOLDING DEVICES

GRIND WORK SQUARE
GRIND WORK PARALLEL
HOLD ROUND PIECES

Universal set in Case $27.50

GEORGE SCHERR CO., Inc.
COMPLETE LINE OF PRECISION INSTRUMENTS
WEST COAST BRANCH: SCHERR-TUMICO CO. - 3337 W. Olympic Blvd. - Los Angeles 19, Cal.
200-GF LAFAYETTE STREET • NEW YORK 12, N. Y.

Use postpaid card. Circle No. 249

Machinery & Equipment Sales, Inc., 1012 Cathedral St., Baltimore, has been selected to represent **American Air Filter Co., Inc.,** for the marketing in the Baltimore area of its air filter, dust control and engine and compressor products.

President of the firm is **C. A. Conklin, III.** Associates are **R. G. Vaughan, Jr.,** and **John P. Johnston.**

Mel Shane, Inc., of 19137 Filer, Detroit, has been appointed as a distributor for **The Sterling Grinding Wheel Co.** of Tiffin, Ohio, distributing Sterling's complete line of abrasive products in the metropolitan Detroit area.

The Mel Shane, Inc., staff includes specialists with a considerable background in the abrasive field.

The **Tool and Wheel Division** of the **American Coldset Corp.** of Teterboro, N.J. has named the **Haines Tool Co.,** 6536 Carnegie Ave., Cleveland 13, Ohio, and **Cummins Machinery Co.,** 182-184 Courtland St., N.E., Atlanta, Ga. as sales representatives to handle sales of their diamond tools and diamond grinding wheels.

Haines Tool will cover northern Ohio, and the territory reached by Cummins Machinery will be parts of Georgia.

The Leon J. Barrett Co. of Worcester, Mass., manufacturers of heavy-duty centrifugal equipment, has appointed the **George H. Anderson & Associates** of 205 W. Wacker Dr., Chicago 6, Ill., as sales engineers in the Chicago, northern Illinois and northwestern Indiana territories for its products.

Norton Co. Appointments At Home and Abroad

Norton Behr-Manning Overseas Inc. has named a General Manager and two new Vice-Presidents. **Frank M. Ryan,** Vice-President since 1951, now becomes Vice-President and General

F. M. Ryan

F. B. Scott

Manager of this Norton Co. Division. **Fordyce B. Scott,** formerly General Manager of Behr-Manning de France, comes to the company's main office at Worcester, Mass., as Vice-President in Charge of Sales of Behr-Manning tape and coated abrasive products. **Louis J. Camarra,** former European Regional Manager, returns to Worcester as Vice-President in Charge of Sales of Norton abrasive and refractory products.

Ralph M. Johnson, Vice-President of Norton Co., has retired as Director of Sales. He was re-elected a Director and Vice-President, and will be retained as a consultant for one year. He retired also as a Director of Behr-Manning Co., a Norton division located in Troy, N.Y.

George N. Jeppson was re-elected Chairman of the Board and **Milton P. Higgins** was re-elected President of Norton Co.

William H. Perks, Norton Treasurer and Controller, was appointed a Director of Behr-Manning Co. to succeed Johnson. **Lester A. Hansen,** Behr-Manning Technical Director, Coated Abrasive Technical Department, was also appointed a Behr-Manning Director to fill the vacancy caused by the retirement last October of **John O. Amstuz,** Behr-Manning's former Vice-President in Charge of Engineering.

L. J. Camarra

W. R. Trezise

Walter R. Trezise has been appointed Sales Manager of the Atlas Abrasives Corp. of Greenwich, Conn. Trezise has spent 25 years in coated abrasives—the first 20 years with Behr-Manning as Regional Engineer and the last five years as Sales Manager of the Clover Manufacturing Co., Norwalk, Conn. He is an active member of the Coated Abrasive Manufacturers' Institute.

John W. Peterson has been appointed a field engineer at Norton Company's Philadelphia district office. He joined the company in 1954 after graduating from Dartmouth College and the Amos Tuck School of Business Administration.

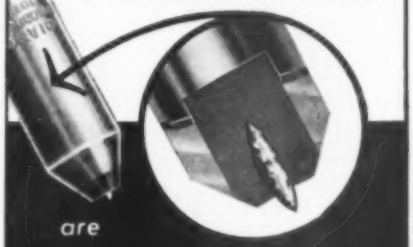
Dr. Ellis Abrams and **Paul J. Welsh** have been promoted to Assistant Managers of Research by E. F. Houghton & Co., Philadelphia suppliers of oils, packings, and chemicals. Responsibility for supervision of textile, paper, and organic research goes to Dr. Abrams, who was formerly Supervisor of Organic Research. Welsh, previously Manager of Product Development, will supervise the company's research in metal working, rust preventives, and lubrication.

Only

PRESTALLOY®

Oriented

DIAMOND DRESSERS



are

"Pressure-Set"

to

LAST LONGER... CUT CLEANER

Regardless of your wheel dressing problem . . . you'll find PRESTALLOY tools cut cleaner and last longer . . . thanks to exclusive "Pressure-Set" processing! This advanced method of anchoring, permanently locks the diamonds in place at the correct operating angle . . . to insure maximum dressing speed and efficiency. Couple these field-proven advantages with the completeness of the PRESTALLOY line, and you'll know why there's a PRESTALLOY tool to meet your specific needs. Below are shown but a few of the many standard PRESTALLOY dressers immediately available.

SINGLE STONE DRESSERS for straight form and radius work.

IMPREGNATED DRESSERS for production grinding operations.

MULTI-DIAMOND for straight face and side dressing.

PROFILE DRESSERS for straight, form and profile use.

New illustrated PRESTALLOY catalog yours for the asking. Write today!

Fast delivery on non-standard dressing tools to your exact specifications. Send us your prints for quotation.

DIAMOND PRODUCTS, INC.

333 Prospect St • Elyria, Ohio

Dealerships available in some areas

Use postpaid card. Circle No. 250

??????????????????????????????

DO YOU OWN

Cro-Plate

WET BLAST EQUIPMENT

As successors to the Cro-Plate Company, Inc., the former manufacturers of Pressure Blast wet blasting equipment, we can meet all your maintenance and service requirements. Spare parts and abrasives are immediately available from stock.

Send today for your copies of our new revised parts list, instruction manual, abrasive price schedule and the name of the Authorized Pressure Blast Distributor nearest you.

PRESSURE BLAST MFG. CO., INC.
24 Pleasant St. Manchester, Conn.

Use postpaid card. Circle No. 251

New, Lightweight, Powerful

FLEXIBLE TOOL SHAFT

Connects To Any Motor

Stow flexible tool shafts increase precision, eliminate operator fatigue on production grinding, polishing, sanding and other finishing operations in which the operator must hold the tool for long periods of time. Up to 3 HP can be transmitted through these new tool shafts, which consist of a core made of highest grade music wire rotating inside a rubber-covered casing. Each shaft furnished with ball bearing motor connection and high-speed ball bearing handpiece with removable wheel Arbor having ½-20" threads. An angle head can be used in place of the handpiece as shown in the photograph.

Four Sizes of these shafts are available . . . models 38, 40, 50 and 63, which come in 6-foot standard lengths. The largest shaft, model 63, will handle 3 HP at speeds up to 6900 RPM and has a maximum capacity for various accessories as follows: grinding wheel, 8" x 1"; buffing wheel, 8" x 1"; sanding disc, 9" diameter; sanding drum, 6" x 2½"; wire brush, 8" x 2"; steel drills, ½" diameter.

Write for Catalog 59

STOW MANUFACTURING CO.
310 Shear St. Binghamton, New York

Use postpaid card. Circle No. 253

FREE TRIAL OFFER
NO STRINGS ATTACHED

A VALUABLE KIT

Carton contains 6 grades of ultra-fine quality, assorted fine grit abrasive compounds suitable for a variety of work. Coarser grit compound can also be supplied.

FOR PRECISION LAPPING

Here's a get-acquainted offer you cannot afford to miss. Among these samples will be found the answer to many a tool room lapping problem. Hard and soft abrasives for all kinds of lapping needs. Sent post paid anywhere in the U.S.A. and Canada.

No obligation—write today on your company letterhead.

OFFER LIMITED to those writing on company letterhead

PROVE THEM AT OUR EXPENSE!

UNITED STATES PRODUCTS CO.
513 MELWOOD ST. USP PITTSBURGH, PA.

Use postpaid card. Circle No. 252

FOR FASTER GRINDING at LOWER COST

USE **A.I.T.** Diamond Wheels for all Carbide Grinding

RESIN B-60
Cup Type Diamond Wheel

The exclusive B-60 Bond used in A.I.T. bonded diamond wheels has been field tested in over 400 plants. We can *prove* these superior advantages to you in YOUR plant:

- Faster grinding
- Up to 40% longer wheel life
- One grit size wheel can be used to hog and finish—for extra savings.
- Wheel grinds cooler—does not fracture carbide
- Corners stay sharper longer
- No re-dressing of diamond surface
- NEW BACKING dissipates heat faster
- No down-time for dressing inside body section

Write today for new, FREE catalog and prices

A.I.T. Diamond Tool Co.
8215 N. KIMBALL AVE.
SKOKIE, ILLINOIS

Use postpaid card. Circle No 254

Conforms to ASA Safety Code requirements for cupwheel guards

CARROLL'S SAFETY-GUARD INSERTS

Give you BUILT-IN Operator Safety and Top Performance.

This radically new Safety Guard Insert with its integrated revolving guard gives you the all-important safety factor with increased wheel strength and efficiency.

Added economies in production are gained from the ready-made molding form provided by the Guard. True dynamic balance, back flatness and concentricity, show consistently close tolerances within .010 T.I.R.

Safe grinding wheels mean increased production — use and specify wheels with the new Carroll Safety Guard.

• A Positive Guard on Every Cup Wheel • Highest Safety Factor • One Piece Assembly • Increased Strength • Light Weight • Fool Proof Mounting • No Adjustment Necessary • True Dynamic Balance

PM INC. *Write for Information on Carroll's Safety Guard Insert*

CARROLL
PRESSED METAL, INC.
133 DEWEY ST.
WORCESTER 10, MASS.

Use postpaid card. Circle No .255

NEWS OF INDUSTRY *continued*

H. R. Neifert

R. McKelvey

R. L. Hill

W. F. Green

J. W. Rundt

G. P. Michalos

Timken Co. Promotions

Advancements recently made at The Timken Roller Bearing Co. of Canton, Ohio, include: **Harry R. Neifert,** now Chief Engineer of Physical Laboratories; **Ralph McKelvey,** Assistant Chief Engineer, and **Raymond L. Hill,** Project Engineer.

Neifert joined the company in 1936 as an Engineer in the Railway Research Dept. and was placed in charge of that department in 1939. McKelvey, starting as a Test Engineer in the Physical Laboratories in 1948, advanced to Project Engineer in 1954. Hill first worked for the company as test car driver in 1927, and a year later began his work in the Physical Laboratory, as a mechanic.

As concerns the Production Development Division, **Walter F. Green,** having been its Manager, is now General Manager. **John W. Rundt** has been named Assistant General Manager and Chief Engineer, having served in various departments as well as this Division.

George P. Michalos, has been made Superintendent of Inspection, the Steel and Tube Division of the Timken Roller Bearing Co. of Canton, Ohio. Michalos joined the Metallurgical Dept. of the company in 1941, and has served Timken in various capacities through the years, except for 5 years' service as an officer in the United States Navy.

SEND FOR CATALOG

NAME
TITLE
COMPANY
STREET
CITY/STATE

DRESS SNAGGING WHEELS:

Coarse snagging wheels grind faster, last far longer when dressed regularly with a Desmond Heavy Duty dresser. Even on high-speed resinoid and rubber bonded wheels inexpensive Desmond mechanical dressers expose new, sharp grains and provide a fresh, unloaded surface. Desmond Hex and Huntington dressers are widely used on large and medium size vitrified and silicate wheels. Desmond dressers soon pay for themselves.

The only complete line of grinding wheel dressers and cutters

Desmond
Desmond-Stephan Mfg. Co.
Urbana, Ohio

Use postpaid card. Circle No. 256

R. J. Webb

C. L. Warwick

A. T. Blackburn

C. Eby

R. H. Van Huizen

Allis-Chalmers Elections

The Board of Directors of Allis-Chalmers Manufacturing Co. of Milwaukee elected **Joel Hunter**, President of the Crucible Steel Co. of America, Pittsburgh, a Director of the Board, and **Beauchamp E. Smith**, General Manager of the Hydraulic Division of the company with headquarters at York, Pa., a Vice-President.

Hunter is President of Crucible Steel Co. of America, having been elected to that post in 1954. Smith previously was President of the S. Morgan Smith Co. of York, Pa., which recently became the York Works of Allis-Chalmers.

R. J. Webb, well-known in the machine tool manufacturing and sales field for his leadership in establishing modern distribution practices, has been elected a Vice-President of Marshall & Huschart Machinery Co., machine tool distributors of Chicago. He has been associated with the company for more than 20 years.

C. Laurence Warwick, Jr. has been appointed to the new position of Assistant to the General Manager—Production Activities for the Page Steel & Wire Division of the American Chain & Cable Co., Inc. He will make his headquarters at the main plant, First and River Sts., Monessen, Pa.

Alfred T. Blackburn was elected Vice-President in charge of Manufacturing for The Cincinnati Milling Machine Co. He has been with the company since 1925 and was named Works Manager in 1954.

Clyde Eby was appointed Works Manager for the firm, having begun his association with Cincinnati Milling in 1936 as a University of Cincinnati Co-op.

Robert H. Van Huizen has been named Sales Engineer in the Mid-Atlantic territory for Engelberg, Inc., Syracuse, N.Y., manufacturers of abrasive belt machinery. Van Huizen, headquartering at 106 Struyk Ave., Paterson, N.J., will cover Md., Dela., N.J., Eastern Pa., and metropolitan New York City.

ACCURACY
.0002 T.I.R.

.0002 T.I.R. or less at Spindle Nose, .0005 T.I.R. or less on Test Arbor six inches from Spindle Nose

SPINDLE SPEEDS 150 and 250 RPM Other Spindle Speed Pulleys Available

MODEL B943 MOTOR DRIVEN WORK HEAD

No. 11 B & S Tapered Spindle Standard Equipment. No. 12 B & S or No. 5 Morse Available at Slight Extra Cost.

Clip ad to your letterhead and send for Literature

K. O. Lee Company, Aberdeen, S. D.

Use postpaid card. Circle No. 257

WHY WASTE TIME?

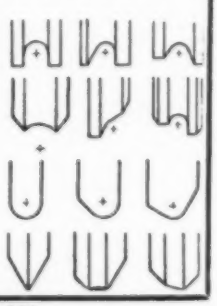
Dress Profiles like these in a few minutes without Templates or Crusher Rolls with the Jeon Automatic Angle Tangent to Radius Dresser. It's fully universal.

Patented

Write for Price and Folder

Representatives Wanted In Some Areas

CONCAVE DRESSING TOOL



JEON MANUFACTURING CO.

P. O. BOX 6750 WASHINGTON 20, D. C.

Use postpaid card. Circle No. 258

KAY & WARREN COMPANY

Reclaimers of

Industrial Diamonds and Diamond Powders

33 Box Street Brooklyn 22, N.Y.

Our reclaiming department salvages diamond powders from wheels, sludges, hones, saw blades, cotton wastes or any type of diamond bearing material. We will submit quotations on an analysis basis.

Inquiries Invited!

Use postpaid card. Circle No. 259

● ACTUAL MANUFACTURERS OF RESINOID METAL AND VITRIFIED DIAMOND WHEELS UP TO AND INCLUDING 20" DIAMETERS

Call or write for literature today!

TRADE® MARK
THE P.L. KUZMICK CO. VERONA, N.J.

THE PAUL L. KUZMICK COMPANY
271-279 GROVE AVE.
VERONA, N.J.

● MANUFACTURERS OF RESINOID AND RUBBER BONDED WHEELS SERVING THE AIRCRAFT, CUTLERY AND STEEL FABRICATING INDUSTRIES.

Call or write for literature today

PEKAY ABRASIVES, INC.
271 GROVE AVE.
VERONA, N.J.

P&W Names Sales Managers

George A. Crittenden, formerly Manager of the Philadelphia office, has been named District Sales Manager of the New York office of Pratt & Whitney Co., West Hartford 1, Conn. He will head all cutting tool and gage sales activities in the New York City territory.

Victor H. G. Wadlund, a member of the sales staff of the Philadelphia office, has been named District Manager of that office to succeed Crittenden.

Donald A. Heaton, also a member of the Philadelphia sales staff, has been named District Sales Manager in charge of all cutting tool and gage sales activities in the Philadelphia territory.

J. H. Daley

R. A. Kindig, Jr.

James H. Daley has been named Sales Manager of the Machine Tool Division of Pratt & Whitney Co., Inc., West Hartford, Conn. He assumes the position held by **James D. Allan** who remains as a Sales Consultant with P & W until his retirement in July.

Daley, who joined the company in 1941, returns to the home office after serving as District Manager of the Cincinnati office.

Robert A. Kindig, Jr., has been appointed the Abrasives Specialist of Stambaugh Supply, the industrial and contractor supply division of The Stambaugh-Thompson Co., Youngstown, Ohio. Kindig, who has had ten years of specialized grinding wheel and coated abrasives experience, will devote his entire time to assisting industries with their technical abrasives problems.

FEEDCISION

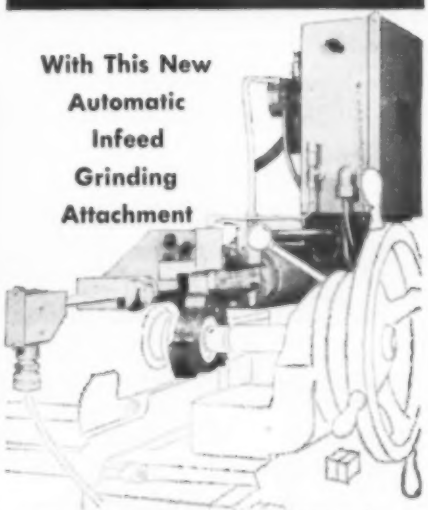
INCREASES CENTERLESS GRINDING PRODUCTION

200%

YES

300%

With This New Automatic Infeed Grinding Attachment



Utmost precision in grinding and duplicate sizing. Sizing dial is graduated in (.00001) one hundredth of a thousandth of an inch. No hydraulic checking cylinder to change feed rate when oil is cold. No checking of oil level or refilling of hydraulic checking cylinder. Three (3) different feed rates are available in one unit for the fastest, most efficient, and precise sizing in a centerless grinder.

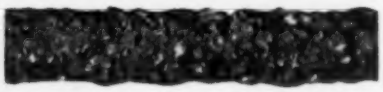
CAN BE USED FOR TRU-FEED AS WELL AS INFEED for close sizing. Ideally located push button control station consists of Stop-Button, Caution Pilot Light, and a selector switch for set up or auto grinding positions. **CATALOG** — Write for it today!

MODERN DEVICES
Subsidiary of
TWENTIETH CENTURY MFG. CO.
Box 429G Libertyville, Illinois

Open Territories for Manufacturers' Representatives
Use postpaid card. Circle No. 261

Diamond Coated Band Saw Blades

Electro Formed Nickel Bond



Enlarged Section of Cutting Edge

For cut-off of reinforced plastics, ceramics, carbides & glass. Ideal for wafering of large diameter Germanium and Silicon Solar Discs.

Now available — diamond saws especially designed for cut-off & machining of reinforced plastics. Precision cut-off wheels for semi-conductor production — made in thicknesses down to .004".

Sample Marshall Laboratories, Inc.
Manufacturers Of Quality Diamond Tools
63 Park Avenue Lyndhurst, N.J.
WEbster 3-0570

Use postpaid card. Circle No. 262

NEWS OF INDUSTRY *continued*

Christian F. Rupp has joined the Philadelphia district sales organization of Bay State Abrasive Products Co. in Westboro, Mass. A graduate of the United States Military Academy at West Point, Rupp was formerly employed by the Public Relations Institute, Gastonia, N.C.

Richard L. Hackett has been appointed a Sales Supervisor, Armour Coated Abrasives Division, Armour and Co., Alliance, Ohio. He will supervise the sales of both industrial and retail coated abrasive products in the Southern and Eastern sections of the State of Michigan.

Prior to becoming associated with the company, Hackett was a Field Sales Engineer with the Macklin Co.

Wilson B. Green of New Richmond, Ohio, has been named as Sales Representative for the Techline Division of Wheelabrator Corp., Vicksburg, Mich. Green's territory includes the Southern part of Ohio, the Eastern half of Kentucky, and most of the State of West Virginia. He has been engaged for over 16 years in the field of metal processing and finishing, specializing in automatic processes in both the finishing and plating fields.

American Coldset Corp. of Teterboro N.J. has appointed **Howard W. "Hap" Arnold** as General Manager of all its divisions. In his new post, he will concentrate on the development of new products, wider markets for present products, a re-alignment of sales areas, and the implementing of more energetic sales programs and improved sales policies.

A graduate of Amherst College and Harvard Business School, Arnold has until recently been associated with General Electric, Metallurgical Products Dept., "Carboloy" in Detroit.

Please Mention

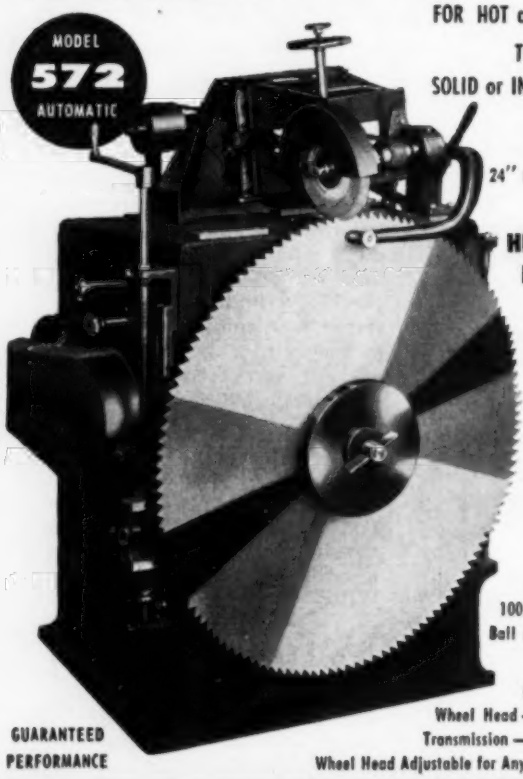
GRINDING & FINISHING

When Writing Advertisers

HANCHETT METAL SAW SHARPENER

FOR HOT and COLD SAWS
TYPES
SOLID or INSERTED TOOTH

MODEL 572 AUTOMATIC



CAPACITY
24" to 72" and Larger

HEAVY DUTY
POWERFULL
SMOOTH
ACCURATE

DEALER INQUIRIES INVITED

BEARINGS
100% Anti-Friction
Ball and Roller Types

MOTORS
Wheel Head — 2 H.P. — 1800
Transmission — ½ H.P. — 1200
Wheel Head Adjustable for Any Saw Tooth Angle

GUARANTEED PERFORMANCE

HANCHETT MANUFACTURING COMPANY
Main Plant BIG RAPIDS, MICH.
West Coast PORTLAND 1, ORE.

Use postpaid card. Circle No. 263

USE THIS NEW KIND OF DIAMOND CUT-OFF WHEEL

Gives narrower, smoother cuts on industry's toughest materials

. . . yet prices start at only $32.25

Now . . . at *production prices* . . . DIATRONIC gives you a rim width of .006" that's accurate to a maximum total tolerance of .0005"—or your money back. This accuracy is built in by a new process. No break-in needed. New narrow cut reduces sawdust loss 30%. A must for $3,000-a-pound silicon or germanium crystal. Cuts tungsten carbide, corundum, aluminum oxide, glass . . . practically anything. Stock orders shipped in hours; special wheels available. Write for literature, price list.

Another invention marketed by
NAVAN PRODUCTS, INC.
Subsidiary of North American Aviation, Inc.
Dept. 161, International Airport, Los Angeles 45, Cal.

DIATRONIC* DIAMOND WHEELS
"with built-in tolerance" *TRADEMARK

Use postpaid card. Circle No. 264

The Tool and Wheel Div. of the American Coldset Corp. of Teterboro, N.J., recently named three sales representatives to handle sales of its diamond tools and diamond grinding wheels.

Eugene L. Brown will cover northern Alabama, with headquarters at 4245 Morris Ave., Birmingham 12, Ala. Parts of eastern Pennsylvania and all of southern New Jersey is the territory of **W. E. Miller**, who will work out of 11 Orchard Lane, Levittown, Pa. **M. E. Clark's** territory is northern Connecticut, all of Massachusetts, Maine, New Hampshire and Vermont, with headquarters at North Granby, Conn.

Obituary

August (Gus) Sunnen passed away in his Chatham, Ontario home on December 23. President and General Manager of Sunnen Products Co., Ltd., a Canadian subsidiary of Sunnen Products Co. in St. Louis, Mo., he will long be remembered for his work in the development and use of automotive service tools. Born in Kangley, Ill. on July 15, 1888, he quickly became associated with the industry and as early as 1910 was operating a garage in Mexico, Mo.

REPRESENTATIVE WANTED

in several territories by

Manufacturers of:
Precision-graded diamond powders and diamond compounds for ultra-high finishes and other industrial diamond products for fast stock removal.

We supply our products to:
Wire manufacturers, carbide fabricators, metallographic laboratories, electronics manufacturers, tool rooms, plastic mold makers and for component parts.

THE AMPLEX CORPORATION
968 FARMINGTON AVENUE
WEST HARTFORD 7, CONN.
TEL. HARTFORD ADams 2-0312

DEMONSTRABLY, the WORLD'S FINEST
DIAMOND WHEEL LINE
AVAILABLE IN
RESTRICTED TERRITORIES
We are seeking expanded distribution control in all key U.S. Industrial areas.
Box 22
Grinding & Finishing, Wheaton, Ill.

JOBBERS WANTED
We manufacture Kob-Kleen (ground corn cobs) for deburring, burnishing, polishing and soft grit blasting of metals; metal stamping absorbents, etc. Nationally advertised.
COEVAL, INC.
Dept. A, St. Joseph, Illinois

There's more than luck to
CLOVER COATED ABRASIVES . . .

The man who has used Clover Abrasives for years is apt to believe in luck. *He is lucky* that he has been introduced to Clover products. But that kind of good fortune is built in when the product is made. Part of it rests in our discriminating choice of the best materials available; the other part in the care real craftsmen use in making a tool.

Fifty-odd years of experience have proven many times that Clover Coated Abrasives are a lucky choice because they are made for hard service. Ask your Clover Distributor for samples or for a new Clover Catalog, or write us direct. You owe it to yourself to see the Clover line.

Clover Manufacturing Company
Norwalk, Connecticut
Victor 7-4515
Since 1903
Makers of the famous
CLOVER Grinding and Lapping **COMPOUNDS**

Use postpaid card. Circle No. 265

BONDED
to your needs!

Because, Clipper Diamond Wheels come in three different types:

Resin-Bonded: Most commonly used for dry grinding all types of carbide. Fast. Stays cool.

Metal-Bonded: Usually for grinding glass, quartz, ceramics, carbides, etc.

Ceramet-Bonded: Featuring a ceramic vitreous bond for fast cutting and long life. No glaze, even if steel is ground with carbide.

Tell us your grinding requirements. We'll provide the *right* diamond wheel.

GET YOUR COPY!
New Clipper Catalog CW58 sent on request.

Clipper Diamond Tool Co.
345 HUDSON STREET, NEW YORK 14, N. Y. • CHelsea 2-7143

Use postpaid card. Circle No. 266

DISTRICT MANAGERS
GRINDING & FINISHING

EASTERN DIVISION

Dan E. Reardon, V.P. in charge
c/o Hitchcock Publishing Co.
55 West 42nd St., N.Y. 36, N.Y.
Telephone: LAckawanna 4-4528
Home Address: Box 1, South Glastonbury, Conn.
Telephone: MEdford 3-7083

New England

John Pickering, Jr.
c/o Hitchcock Publishing Co.
Box 29, Andover, Mass.
Telephone: GReenleaf 5-0499

Eastern N.Y. and N.Y. City, Eastern Penna., N.J., Md., Dela., D. of C., Va.

Ralph Payne
c/o Hitchcock Publishing Co.
55 West 42nd St., N.Y. 36, N.Y.
Telephone: LAckawanna 4-4528

CENTRAL DIVISION

Southern Half Chicago, Lake County, Ind.

Henry Smith, V.P. in charge
c/o Hitchcock Publishing Co.
Wheaton, Ill.
Telephone: MOntrose 5-1000

Western Ohio, Southern Ind., Kentucky

James C. Stewart, V.P.
c/o Hitchcock Publishing Co.
Wheaton, Ill.
Telephone: MOntrose 5-1000

Michigan, Northern Indiana

William E. Jacobs
c/o Hitchcock Publishing Co.
18055 James Couzens Highway
Detroit, Mich.
Telephone: DIamond 1-9525

Illinois, Northern Chicago, Ia., Mo., Wisc., Upper Mich., South Dakota

Robert G. Bolinder
c/o Hitchcock Publishing Co.
Wheaton, Ill.
Telephone: MOntrose 5-1000

Western N.Y. State, Western Penna., Eastern Ohio

Ralph E. Helfrick
1507 Edgefield Road
Cleveland 24, Ohio
Telephone: HIllcrest 2-0189

WESTERN DIVISION

California, Arizona

Keith H. Evans
3723 Wilshire Blvd., Los Angeles 5, Cal.
Telephone: DUnkirk 8-2981 and
Room 225-515 Market St. Bldg.
San Francisco 5, Cal.
Telephone: YUkon 2-4280

Oregon, Washington

Lloyd Thorpe
212 General Ins. Bldg., Seattle 5, Wash.
Telephone: MElrose 3-4242

Don't Miss these Features

GRINDING and FINISHING

CONTENTS FOR MARCH 1959

28 The Allis-Chalmers Portable Tool Control Program
A unique safety control program for portable tools.

36 "In Place" Roll Grinding
Costly maintenance problem solved by portable roll grinder.

40 The Case For "Built-In Guard" Cup Wheels
Tests provide evidence of advantages for built-in guards.

42 Tool Geometry Grinding Solved
New tool grinder obtains greater repeatability.

45 Surfacing Zirconium Alloy Sheet With Abrasive Belt
Belt finishing of zirconium provides more satisfactory bond.

47 Here's How Wet Blast Cleans Forging Dies
Cuts cleaning time and increases die life.

Coming Next Month

Buffing as Performed At Ford

Buffing is as much an art as any grinding operation. The problems and complexities require skill and elaborate equipment.

Central Coolant Systems—Curse or Cure

The application of a central coolant system can solve many problems but it also presents a number of new and varied problems.

Electrolytic Grinding Replaces Milling of Honeycomb Cores

Honeycomb cores must be free of burrs and must have a good finish for the brazing of the skin to obtain the 100% bond needed. Milling has been replaced for the more accurate and faster grinding method.

Training Completes The Sale

Training of operators greatly enhances the results and profitable use of tool grinder and attachments.

Index to Advertisers

14	Action Diamond Tool Company
74	Aget Manufacturing Company
76	A.I.T. Diamond Tool Company
21	Almco, Queen Products Division, King-Seeley Corporation
	American Chain & Cable Company, Allison Division (second cover)
61	Amplex Corporation
57	Atlantic Abrasive Corporation
50	Bacon Felt Company
58	Barnes Drill Company
6 & 7	Bay State Abrasive Products Company
34 & 35	Besly Welles Corporation
20	Blanchard Machine Company, The
62	Brightboy Industrial Division, Weldon Roberts Rubber Company
27	Brown & Sharpe Manufacturing Company
73	Brunmar Commercial Corporation
24	Brush Instruments, Division of Clevite Corporation
77	Carroll Pressed Metal, Inc.
2 & 3	Cincinnati Milling Machine Company Milling Machine Division
10	Cincinnati Milling Machine Company, Milling Products Division
81	Clipper Diamond Tool Company
81	Clover Manufacturing Company
61	Coeval, Incorporated
16	Commercial Filters Corporation
32	Crane Packing Company
77	Desmond-Stephan Manufacturing Company
75	Diamond Products, Inc.
61	Engelberg, Inc.
72	Engis Equipment Company
15	Exolon Company
66	Fulmer, C. Allen Company
80	Hanchett Manufacturing Company
8	Hill Acme Company
83	Infilco, Incorporated
65	J & S Tool Company
78	Jeon Manufacturing Company
	Jones & Lamson Machine Company (fourth cover)
72	Kansas City Abrasive Company
78	Kay & Warren Company
67	Kramer, H. W. Company
79	Kuzmick, Paul L. Company
78	Lee, K. O. Company
	Macklin Company third cover
51	Manhattan Rubber Division, Raybestos Manhattan Corporation
52	Mattison Machine Works
68	Microbeads, Inc.
79	Modern Devices
22 & 23	Moore Special Tool Company
80	Navan Products
18 & 19	Norton Company
79	Pekay Abrasives Company
69	Pratt & Whitney Company
76	Pressure Blast Manufacturing Company
21	Queen Products Division, Almco, King-Seeley Corporation
51	Raybestos Manhattan Corporation
12	Reid Brothers
44	Rivett Lathe & Grinder Company
60	Rocheleau Tool & Die Company
80	Sample Marshall Laboratories
74	Scherr, George Company, Inc.
5	Simonds Abrasive Company
55	Smit, Inc., J. K. & Sons
76	Stow Manufacturing Company
63	Sundstrand Machine Tool Company, American Broach Division
25	Thompson Grinder Company
56	Timesaver Sanders
70	Torit Manufacturing Company
26	United Engineering Company
4	U.S. Diamond Wheel Company
76	U.S. Products Company
33	U.S. Rubber Company
62	Weldon Roberts Rubber Company, Brightboy Industrial Division
17	Wheelabrator Corporation, Techline Division
64	White & Bagley Company
54	Whitnon Manufacturing Company

• March 16 thru 20 • Booth 968 •

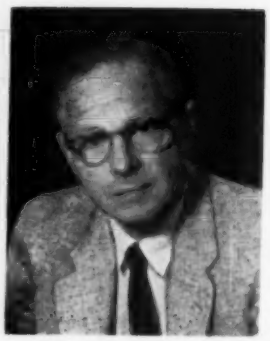
• See you at the Western Metal Congress and Exposition •

It's New!
INFILCO PRESENTS THE
IMPINJO FILTER
(TRADEMARK)
USING THE CONTROLLED
IMPACT
OF COOLANT IMPINGING AGAINST
THE FILTER MEDIUM TO REMOVE ALUMINUM, COPPER, BRASS, STAINLESS OR ANY FERROUS OR NON-FERROUS SOLID
THE "IMPINJO" FILTER
CUTS PRODUCTION COSTS AND SAVES YOU MONEY . . .
on any metalworking operation using coolants or cutting oils. Custom cleaning by impingement is a newly applied principle that increases production, improves work quality, reduces rejects, saves coolant and lengthens tool, wheel or abrasive belt life. Capacity ranges from 3 gpm to 1,000 gpm for a single machine or central system.
Write for Bulletin 9020. It tells how the "IMPINJO" Filter delivers clean coolants.
INFILCO

INFILCO INC. • DEPT. G • P. O. BOX 5033 • TUCSON, ARIZONA

Use postpaid card. Circle No. 267

Specialized Responsibility in Age of Change



Change represents the challenge of fluidity, the harnessing of drift, the organizing for temporary stability. Technologically, socially and economically we are adrift in a changing world. It is well this is so. The dinosaur and his friends were impervious to change and nothing remains of their violation of the Law of Change but a few bones and several old Hollywood grade C movies.

Let us look at the manpower aspect of change in our metalworking industry. I remember my apprentice days and the works manager who ran everything and knew everything. Nothing escaped his eagle eye. He always wore a hat, his vest had buttons missing and his pants were never pressed, but he knew his production and ruled his 2000-odd employees with a just but iron hand. He supervised, bought equipment, kept the peace, improved methods and didn't mind dirtying his hands when the occasion demanded. And there was a simple orderliness about it all. Truly, in his way, a field general, one of thousands throughout the country in the year 1933.

Then came the war, the forties and the fifties. And the engineers. And the specialists. And labor. Change, with money and prosperity pumped into its anemic body, became a whirling dervish. The old field general has long gone into a Happy Hunting Ground for Works Managers and in his place is a corps of plant managers, superintendents, and supervisors; behind them stands a solid phalanx of methods, process, industrial, planning and production engineers, and specialists in controls, instruments, electronics, etc.

Volume of production since the 40's, murderous competition, rising complexities in manufacturing, new processes, labor's raucous voice, add to this the incessant call for lower costs and speedier production and it's not difficult to appreciate the inevitability of specialization.

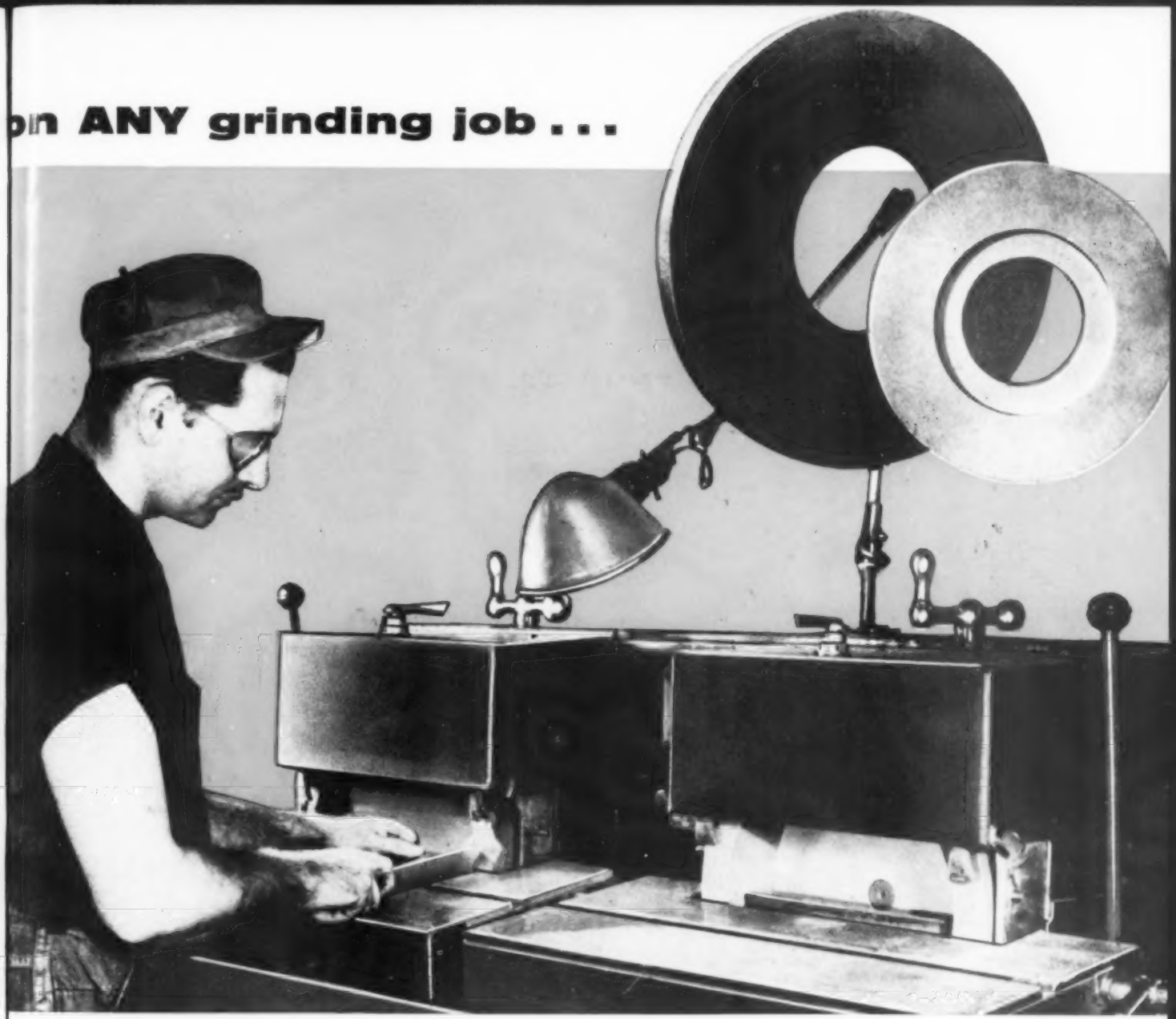
This inevitability of specialization has had a by-product: specialized responsibility, which is the same as: major emphasis or primary duty. The heaviest concentration of readership of this magazine is among those who have chosen one phase of metalworking as worthier of their attention than another. The developments within one segment of metalworking, grinding, for example, have been such that in the majority of companies one man has made grinding wheels his forte and even created a name for it: abrasive engineer. In the realm of the grinding machine and the grinding process we find an engineer or a production executive who has made grinding his specialized responsibility. While he does not ignore other processes, the world of abrasives has become his primary sphere of activity. And so it is that those processes which have shown the greatest development in the last 25 years, and which do not lend themselves readily to formula-and-handbook analysis have, as a necessity, fostered a climate for specialized responsibility to the advantage of company and individual.

For industry to resist change is to ignore specialized responsibility. The Law of Change is as adamant with companies as it is with dinosaurs. The difference is one of kind, not of degree.

Wm. J. Schleicher

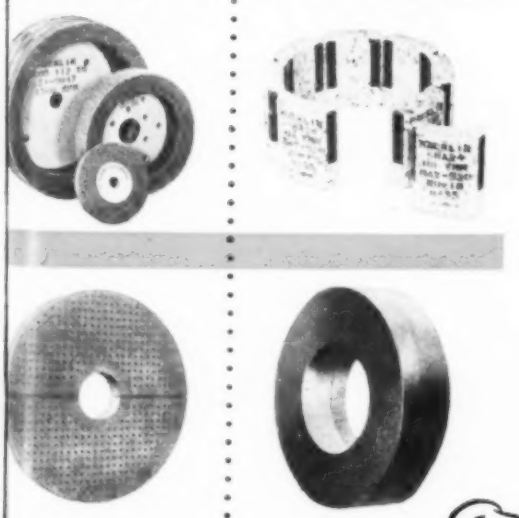
Vice President & Editorial Director

on ANY grinding job . . .



you can protect your production

with MACKLIN *"Wheels of Profit"*



CUSTOM-ENGINEERED FOR YOUR PARTICULAR GRINDING JOB, Macklin "wheels of profit" for industry, add value to your work . . . increase your production . . . and turn out a better product. There are Macklin wheels of every type and size for your particular grinding job.

FOR PRACTICAL ANSWERS to your specific grinding problem, consult a Macklin Abrasive Engineer or your local Macklin Distributor. You'll get expert, on-the-job assistance in determining the exact wheel for top production efficiency.

WRITE OR PHONE TODAY FOR COMPLETE INFORMATION

GRINDING WHEELS

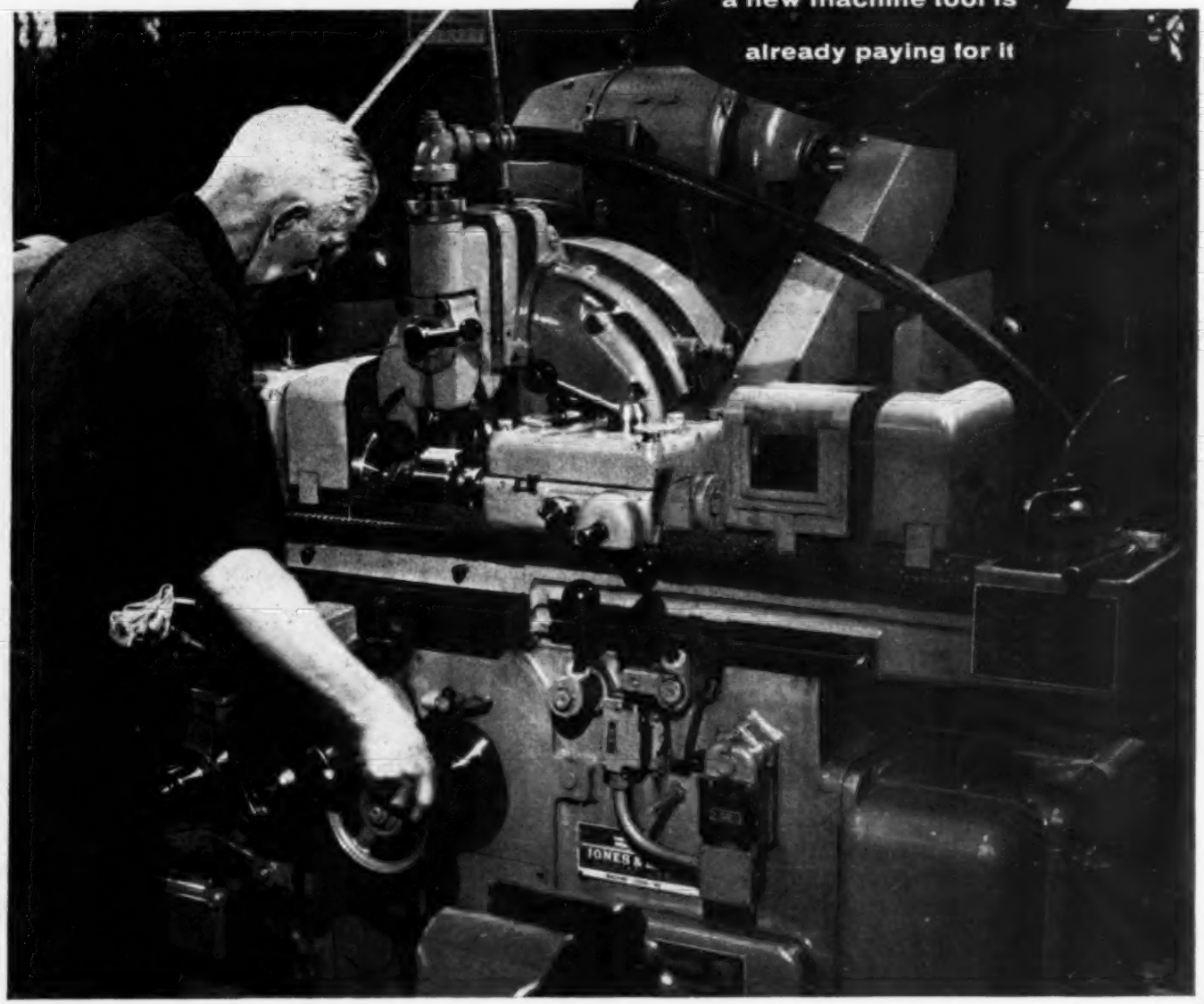
MACKLIN company

Dept. 63 Jackson, Mich.

Use postpaid card. Circle No. 284

JONES & LAMSON MACHINE TOOLS

the man who needs a new machine tool is already paying for it



Close Tolerance Tool Room Work on an Automatic machine with Universal Application

A customer writes: "The versatility of Jones & Lamson Thread Grinders is scarcely tested in the conventional production of hobs, taps, gages and threaded parts. In our toolroom, using the thread grinder as a basis for 'Rube Goldberg' development, we have produced precision racks, small form-profiled milling cutters, oil grooves and grinding wheel crushers.

"While serving the purpose as a necessary piece of equipment, this machine also provides a means by which many additional production problems can be explored and tested. Applying the thread grinder to toolroom problems is putting the best foot forward for quickly producing accurate and dependable shop accessories."

* * *

Write for catalog 600. Jones & Lamson Machine Company, 531 Clinton Street, Springfield, Vermont.

Turret Lathes • Automatic Lathes • Tape Controlled Machines • Thread & Form Grinders • Optical Comparators • Thread Tools

Use postpaid card. Circle No. 285